TEST REPORT

Reference No.	:	WTS18S0199015-1W V1
FCC ID	:	2AG32MBS2130
Applicant	:	Baicells Technologies Co., Ltd.
Address	:	3F, Hui Yuan Development Building, No.1 Shangdi Information Industry Base, Haidian Dist., Beijing, China
Manufacturer	:	The same as above
Address	:	The same as above
Product	:	LTE-TDD Base Station
Model(s)	:	mBS2130
Brand Name	:	BaiCells
Standards	:	FCC CFR Title 47 Part 2 FCC CFR Title 47 Part 90 Subpart Z
Date of Receipt sample	:	2018-01-06
Date of Test	:	2018-01-06 to 2018-02-27
Date of Issue	:	2018-03-07
Test Result	:	**Pass**

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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Ford Wang / Project Engineer

Approved by:

Philo Zhong

Philo Zhong / Manager

2 Laboratories Introduction

Waltek Services (Shenzhen) Co., Ltd is a professional third-party testing and certification laboratory with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by ILAC (International Laboratory Accreditation Cooperation) member. A2LA (American Association for Laboratory Accreditation) of USA, Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC(The Federal Communications Commission), CEC(California energy efficiency), IC(Industry Canada). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as Intertek(ETL-SEMKO), TÜV Rheinland, TÜV SÜD, etc.

Waltek Services (Shenzhen) Co., Ltd is one of the largest and the most comprehensive third party testing laboratory in China. Our test capability covered four large fields: safety test. Electro Magnetic Compatibility (EMC), and energy performance, wireless radio. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

Test Facility:

A. Accreditations for Conformity Assessment (International)

Country/Region	Accreditation Body	Scope	Note
USA	**A2LA (Certificate No.: 4243.01)**	FCC ID \ DOC \ VOC	1
Canada		IC ID \ VOC	2
Japan		MIC-T \ MIC-R	-
Europe		EMCD \ RED	-
Taiwan		NCC	-
Hong Kong		OFCA	-
Australia		RCM	-
India	**International Services**	WPC	-
Thailand		NTC	-
Singapore		IDA	-
Note: 1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476. 2. IC Canada Registration No.: 7760A			

B. TCBs and Notify Bodies Recognized Testing Laboratory.

Recognized Testing Laboratory of …	Notify body number
TUV Rheinland	Optional.
Intertek	
TUV SUD	
SGS	
Phoenix Testlab GmbH	0700
Element Materials Technology Warwick Ltd	0891
Timco Engineering, Inc.	1177
Eurofins Product Service GmbH	0681

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4 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS18S0199015-1W	2018-01-06	2018-01-06 to 2018-02-27	2018-02-28	original	-	Replaced
WTS18S0199015-1W V1	2018-01-06	2018-01-06 to 2018-02-27	2018-03-07	Version 1	updated	Valid

5 General Information

5.1 General Description of E.U.T.

Product:	LTE-TDD Base Station
Model(s):	mBS2130
Model Description:	N/A
Storage Location:	Internal Storage
Note:	N/A

5.2 Details of E.U.T.

Operation Frequency:	3655MHz~3695MHz
Type of Modulation:	QPSK, 16QAM, 64QAM
Antenna installation:	External antenna
Antenna Gain:	3.0dBi
Ratings:	DC 48V
Number of transmitter chains:	2Tx*2Rx (MIMO)*2

For the purpose of increasing capacity and DL/UL throughput, This outdoor TDD base station has 2 cells within one eNB, which means 2 carriers(Master and Slave) are configured correspondingly. Under such circumstance, the deployment of antenna and relative center frequency setting must be taken into account carefully in order to avoid interference from opposite cell.

This device support 2*MIMO(2Tx*2Rx) transmission mode 3 per carrier as defined in the 3GPP specification with two transmission antennas. The MIMO scheme is open loop transmission and the signals are uncorrelated transmitted in multiple channels in a single frequency band. Carrier Aggregation is not supported and no additional requirement for directional gain calculations based on supported operating modes.

Directional gain =GANT + 10 log (ANT_N) dBi

5.3 Channel List

Normal

10MHz		20MHz	
Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
Low	3655	Low	3660
Middle	3675	Middle	3675
High	3695	High	3690

5.4 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test Mode	Description
Data Mode (QPSK)	Keep the EUT in data communicating mode (QPSK). (10MHz, 20MHz)
Data Mode (64QAM)	Keep the EUT in data communicating mode (64QAM). (10MHz, 20MHz)

5.5 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

☐ Yes ☒ No

If Yes, list the related test items and lab information:

Test Lab: N/A

Lab address: N/A

Test items: N/A

6 Test Summary

Test Items	Test Requirement	Result
	FCC	
RF Output Power	Part 2.1046 Part 90.1321	PASS
Modulation Characteristics	Part 2.1047	PASS
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 90.209	PASS
Emission Mask	Part 90.210(b)	PASS
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 90.1323	PASS
Field Strength of Spurious Radiation	Part 2.1053 Part 90.1323	PASS
Frequency stability vs. temperature	Part 2.1055(a)(1)(b) Part 90.213(a)	PASS
Frequency stability vs. voltage	Part 2.1055(d)(1)(2) Part 90.213(a)	PASS

Pass: The EUT complies with the essential requirements in the standard.

Note 1: According to FCC KDB 662911 D01 Multiple Transmitter Output v02r01 & KDB 971168 D01 Power Means License Digital Systems v03.

Note 2: EUT was on continue transmit mode, the duty cycle was 100%.

7 Equipment Used during Test

7.1 Equipments List

Conducted Emissions Test Site 1#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMI Test Receiver	R&S	ESCI	100947	2017-09-12	2018-09-11
2.	LISN	R&S	ENV216	101215	2017-09-12	2018-09-11
3.	Cable	Top	TYPE16(3.5M)	-	2017-09-12	2018-09-11
Conducted Emissions Test Site 2#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMI Test Receiver	R&S	ESCI	101155	2017-09-12	2018-09-11
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	2017-09-12	2018-09-11
3.	Limiter	York	MTS-IMP-136	261115-001-0024	2017-09-12	2018-09-11
4.	Cable	LARGE	RF300	-	2017-09-12	2018-09-11
3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1	Spectrum Analyzer	R&S	FSP	100091	2017-04-29	2018-04-28
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	2017-04-09	2018-04-08
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	2017-04-09	2018-04-08
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	2017-09-12	2018-09-11
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2017-04-09	2018-04-08
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	2017-04-09	2018-04-08
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2017-04-13	2018-04-12
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	2017-04-13	2018-04-12
9	Universal Radio Communication Tester	R&S	CMU 200	112461	2017-04-13	2018-04-12
10	Signal Generator	R&S	SMR20	100046	2017-09-12	2018-09-11
11	Smart Antenna	SCHWARZBECK	HA08	-	2017-04-09	2018-04-08
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No**	**Last Calibration Date**	**Calibration Due Date**

1	Test Receiver	R&S	ESCI	101296	2017-04-13	2018-04-12
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2017-04-09	2018-04-08
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	2017-04-13	2018-04-12
4	Cable	HUBER+SUHNER	CBL2	525178	2017-04-13	2018-04-12
RF Conducted Testing						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	2017-09-12	2018-09-11
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	2017-09-12	2018-09-11
3.	Universal Radio Communication Tester	R&S	CMU 200	112461	2017-04-13	2018-04-12
4	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	2017-09-12	2018-09-11

7.2 Measurement Uncertainty

Parameter	Uncertainty
Conducted Emission	± 3.64 dB(AC mains 150KHz~30MHz)
Radiated Spurious Emissions	± 5.08 dB (Bilog antenna 30M~1000MHz)
	± 5.47 dB (Horn antenna 1000M~25000MHz)
Radio Frequency	± 1 x 10^{-7}Hz
RF Power	± 0.42 dB
RF Power Density	± 0.7dB
Conducted Spurious Emissions	± 2.76 dB (9kHz~26500MHz)
Confidence interval：95%. Confidence factor:k=2	

7.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

8 Transmit Output Power and PSD

Test Requirement:	FCC part90.1321(a)
Test Method:	FCC part2.1046
	ANSI C63.26-2015
Test Mode:	Data communicating mode
Limit:	FCC: (a) Base and fixed stations are limited to 25 watts/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP powerdensity shall not exceed 1 Watt in any one-megahertz slice of spectrum. (b) In addition to the provisions in paragraph (a) of this section, transmitters operating in the 3650-3700 MHz band that emit multipledirectional beams, simultaneously or sequentially, for the purpose of directing signals to individual receivers or to groups of receivers provided theemissions comply with the following: (1) Different information must be transmitted to each receiver. (2) If the transmitter employs an antenna system that emits multiple directional beams but does not emit multiple directional beamssimultaneously, the total output power conducted to the array or arrays that comprise the device, *i.e.*, the sum of the power supplied to allantennas, antenna elements, staves, etc. and summed across all carriers or frequency channels, shall not exceed the limit specified in paragraph(a) of this section, as applicable. The directional antenna gain shall be computed as follows: (i) The directional gain, in dBi, shall be calculated as the sum of 10 log (number of array elements or staves) plus the directional gain, in dBi,of the individual element or stave having the highest gain. (ii) A lower value for the directional gain than that calculated in paragraph (b)(2)(i) of this section will be accepted if sufficient evidence ispresented, *e.g.*, due to shading of the array or coherence loss in the beam-forming. (3) If a transmitter employs an antenna that operates simultaneously on multiple directional beams using the same or different frequencychannels and if transmitted beams overlap, the power shall be reduced to ensure that the aggregate power from the overlapping beams does notexceed the limit specified in paragraph (b)(2) of this section. In addition, the aggregate power transmitted simultaneously on all beams shall notexceed the limit specified in paragraph (b)(2) of this section by more than 8 dB. (4) Transmitters that emit a single directional beam shall operate under the provisions of paragraph (b)(2) of this section.

8.1 EUT Operation

Operating Environment :

Temperature:	22.5 °C
Humidity:	52.1 % RH
Atmospheric Pressure:	101.2kPa

8.2 Test Procedure

RBW=1MHz, VBW=3MHz, Detector mode= Average,

Trace mode: Power averaging over 100 sweeps

8.3 Test Result

Master- Transmit Output Power								
Bandwidth (MHz)	Modulation	Test Channel	Chain 2 Output Power (dBm/10MHz)	Chain 3 Output Power (dBm/10MHz)	Total Power (dBm/10MHz)	Antenna Gain (dBi)	EIRP (dBm/10MHz)	EIRP Limit (dBm/10MHz)
10	QPSK	Low	29.04	29.06	32.06	6.0	38.06	40.0
		Middle	29.07	29.13	32.11	6.0	38.11	
		High	29.20	29.48	32.35	6.0	38.35	
	64QAM	Low	29.29	29.26	32.29	6.0	38.29	
		Middle	29.15	29.40	32.29	6.0	38.29	
		High	29.36	29.27	32.33	6.0	38.33	
Bandwidth (MHz)	Modulation	Test Channel	Chain 2 Output Power (dBm/20MHz)	Chain 3 Output Power (dBm/20MHz)	Total Power (dBm/20MHz)	Antenna Gain (dBi)	EIRP (dBm/20MHz)	EIRP Limit (dBm/20MHz)
20	QPSK	Low	29.35	29.11	32.24	6.0	38.24	40.0
		Middle	29.46	29.43	32.46	6.0	38.46	
		High	29.49	29.53	32.52	6.0	38.52	
	64QAM	Low	29.27	29.24	32.27	6.0	38.27	
		Middle	29.18	29.46	32.33	6.0	38.33	
		High	29.25	29.56	32.42	6.0	38.42	

Master- PSD								
Bandwidth (MHz)	Modulation	Test Channel	Chain 2 PSD (dBm/MHz)	Chain 3 PSD (dBm/MHz)	Total PSD (dBm/MHz)	Antenna Gain (dBi)	EIRP density (dBm/MHz)	EIRP density Limit (dBm/MHz)
10	QPSK	Low	20.967	20.769	23.88	6.0	29.88	30.0
		Middle	20.920	20.900	23.92	6.0	29.92	
		High	20.608	20.876	23.75	6.0	29.75	
	64QAM	Low	21.307	20.588	23.97	6.0	29.97	
		Middle	20.734	20.614	23.68	6.0	29.68	
		High	20.731	20.947	23.85	6.0	29.85	
Bandwidth (MHz)	Modulation	Test Channel	Chain 2 PSD (dBm/MHz)	Chain 3 PSD (dBm/MHz)	Total PSD (dBm/MHz)	Antenna Gain (dBi)	EIRP density (dBm/MHz)	EIRP density Limit (dBm/MHz)
20	QPSK	Low	18.432	18.564	21.51	6.0	27.51	30.0
		Middle	18.037	18.182	21.12	6.0	27.12	
		High	18.757	18.254	21.52	6.0	27.52	
	64QAM	Low	18.326	18.174	21.26	6.0	27.26	
		Middle	18.163	18.391	21.29	6.0	27.29	
		High	18.153	18.209	21.19	6.0	27.19	

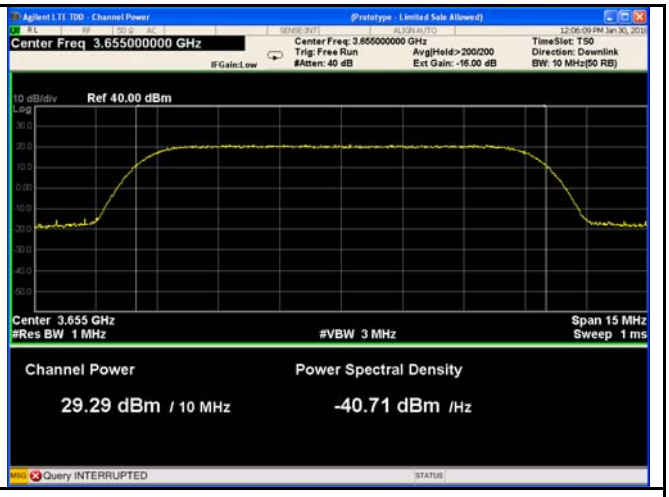
Slave- Transmit Output Power								
Bandwidth (MHz)	Modulation	Test Channel	Chain 0 Output Power (dBm/10MHz)	Chain 1 Output Power (dBm/10MHz)	Total Power (dBm/10MHz)	Antenna Gain (dBi)	EIRP (dBm/10MHz)	EIRP Limit (dBm/10MHz)
10	QPSK	Low	29.26	29.47	32.38	6.0	38.38	40.0
		Middle	29.06	29.17	32.13	6.0	38.13	
		High	29.14	29.34	32.25	6.0	38.25	
	64QAM	Low	29.20	29.43	32.33	6.0	38.33	
		Middle	29.36	29.15	32.27	6.0	38.27	
		High	29.33	29.10	32.23	6.0	38.23	
Bandwidth (MHz)	Modulation	Test Channel	Chain 0 Output Power (dBm/20MHz)	Chain 1 Output Power (dBm/20MHz)	Total Power (dBm/20MHz)	Antenna Gain (dBi)	EIRP (dBm/20MHz)	EIRP Limit (dBm/20MHz)
20	QPSK	Low	29.11	29.02	32.08	6.0	38.08	40.0
		Middle	29.52	29.18	32.36	6.0	38.36	
		High	29.57	29.30	32.45	6.0	38.45	
	64QAM	Low	29.27	29.05	32.17	6.0	38.17	
		Middle	29.32	29.25	32.30	6.0	38.30	
		High	29.26	29.22	32.25	6.0	38.25	

Slave- PSD								
Bandwidth (MHz)	Modulation	Test Channel	Chain 0 PSD (dBm/MHz)	Chain 1 PSD (dBm/MHz)	Total PSD (dBm/MHz)	Antenna Gain (dBi)	EIRP density (dBm/MHz)	EIRP density Limit (dBm/MHz)
10	QPSK	Low	20.943	20.689	23.83	6.0	29.83	30.0
		Middle	20.661	20.516	23.60	6.0	29.60	
		High	21.083	20.834	23.97	6.0	29.97	
	64QAM	Low	20.537	20.945	23.76	6.0	29.76	
		Middle	20.931	20.982	23.97	6.0	29.97	
		High	20.901	20.841	23.88	6.0	29.88	
Bandwidth (MHz)	Modulation	Test Channel	Chain 0 PSD (dBm/MHz)	Chain 1 PSD (dBm/MHz)	Total PSD (dBm/MHz)	Antenna Gain (dBi)	EIRP density (dBm/MHz)	EIRP density Limit (dBm/MHz)
20	QPSK	Low	18.101	18.069	21.10	6.0	27.10	30.0
		Middle	18.219	18.227	21.23	6.0	27.23	
		High	18.559	18.652	21.62	6.0	27.62	
	64QAM	Low	18.221	18.349	21.30	6.0	27.30	
		Middle	18.141	18.395	21.28	6.0	27.28	
		High	18.635	18.301	21.48	6.0	27.48	

Remark: Directional antenna Gain = Antenna Gain + 10 lg (ANT_N) = 3+10 lg (2)=6dBi

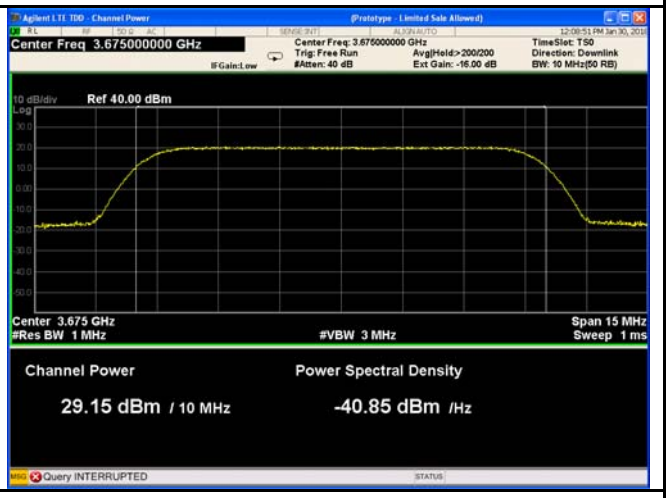
Test Plots
Master-Output Power at antenna terminal
Chain 2

10MHz - Low CH QPSK

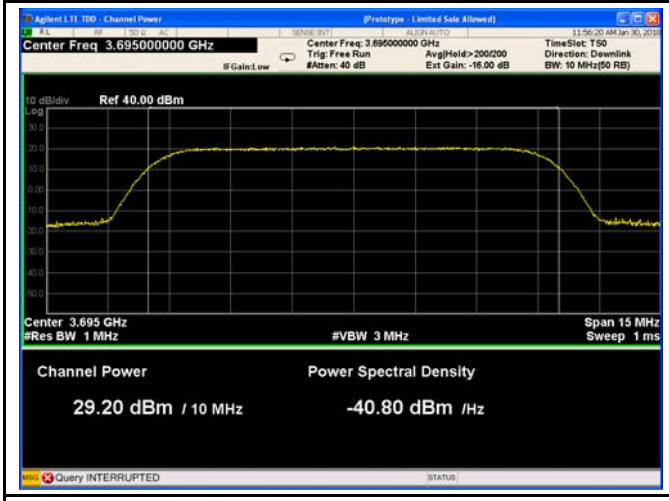


10MHz - Low CH 64QAM

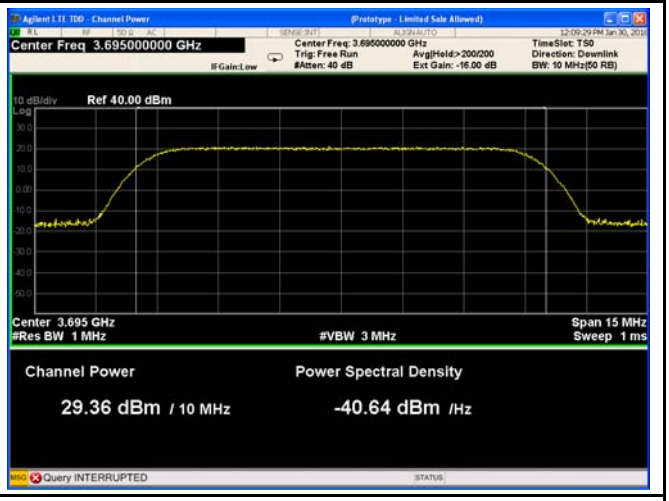
10MHz - Middle CH QPSK



10MHz - Middle CH 64QAM

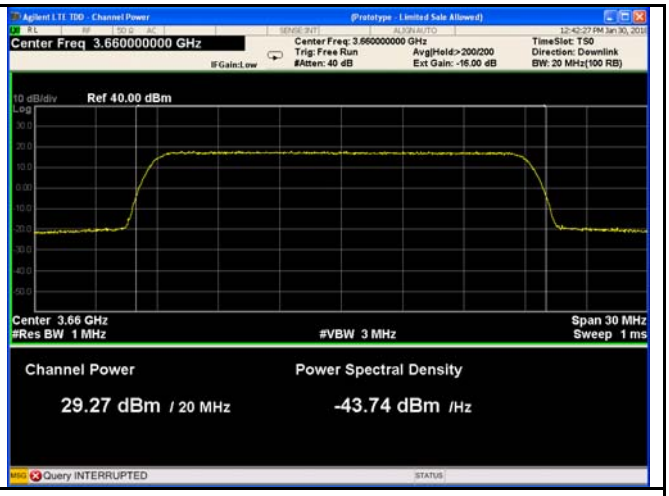


10MHz - High CH QPSK



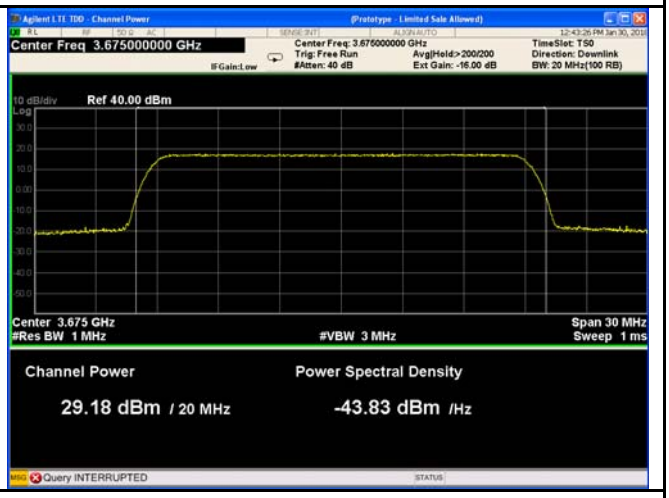
10MHz - High CH 64QAM

20MHz - Low CH QPSK

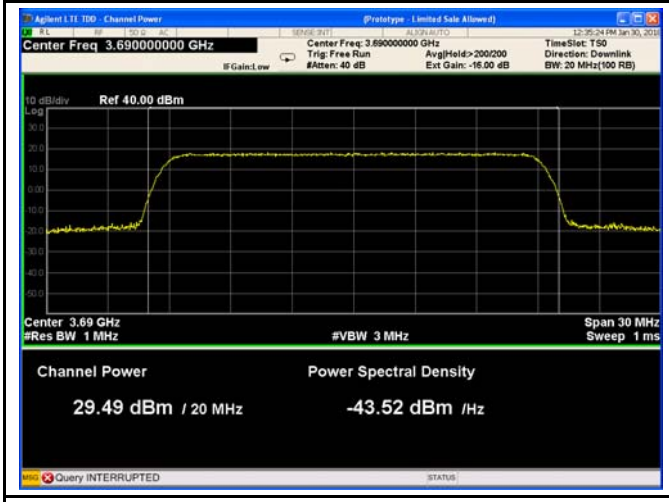


20MHz - Low CH 64QAM

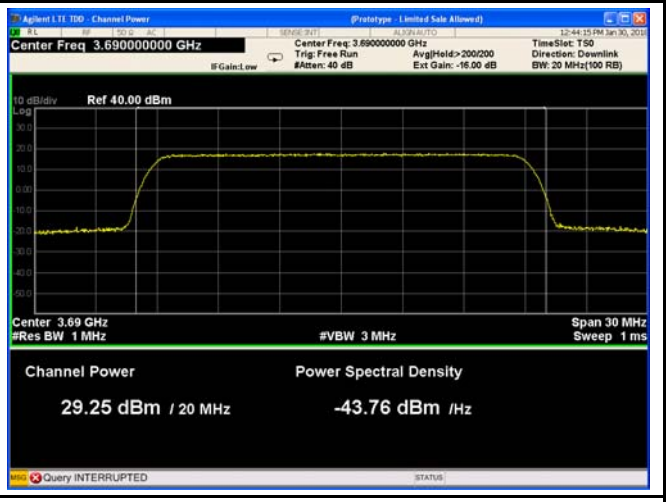
20MHz - Middle CH QPSK



20MHz - Middle CH 64QAM



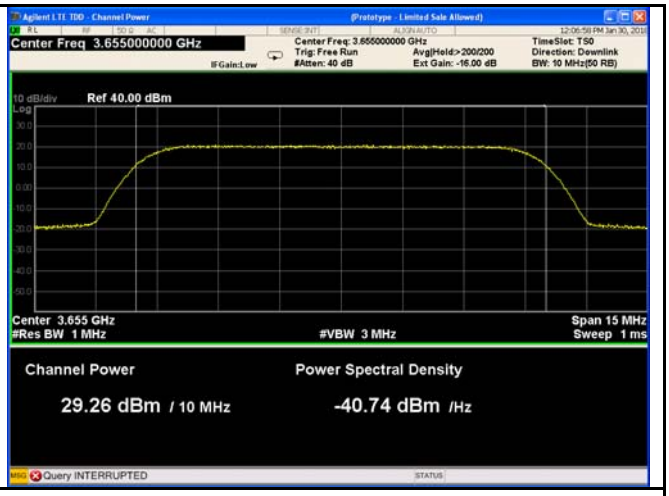
20MHz - High CH QPSK



20MHz - High CH 64QAM

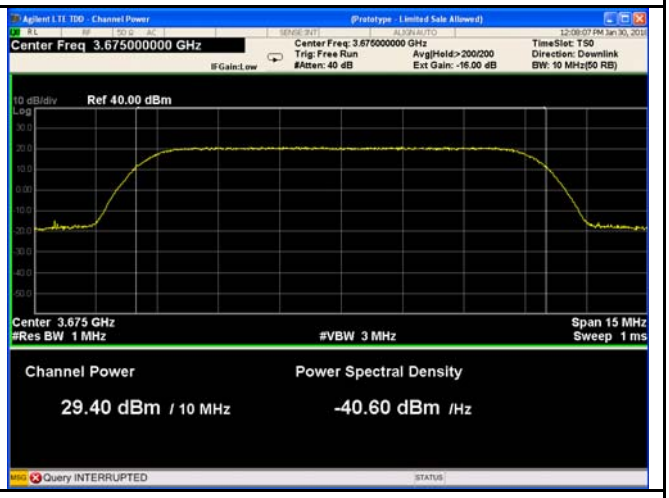
Chain 3

10MHz - Low CH QPSK

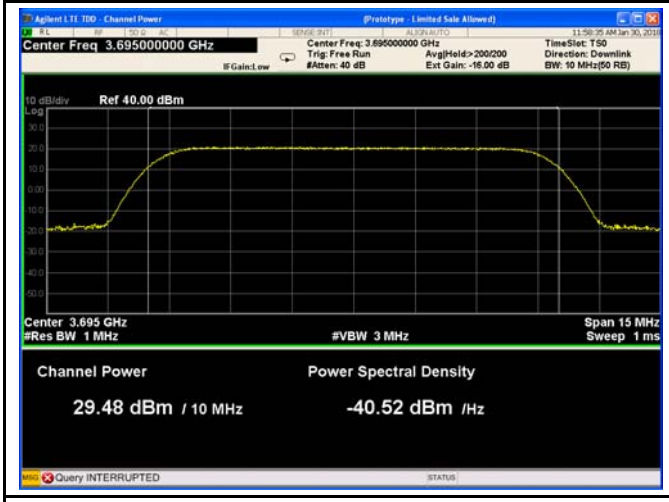


10MHz - Low CH 64QAM

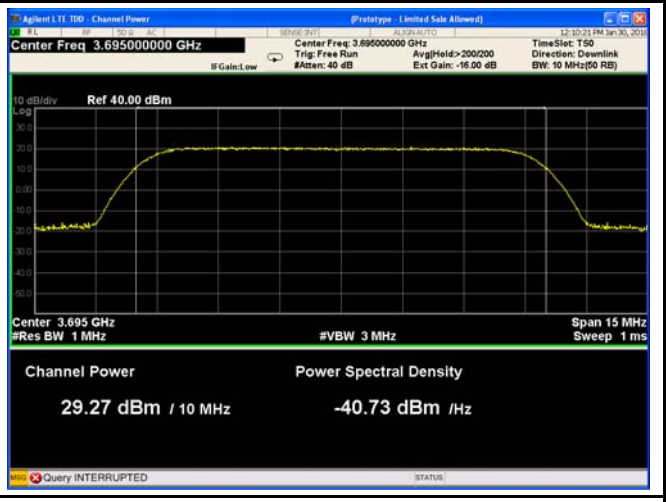
10MHz - Middle CH QPSK



10MHz - Middle CH 64QAM

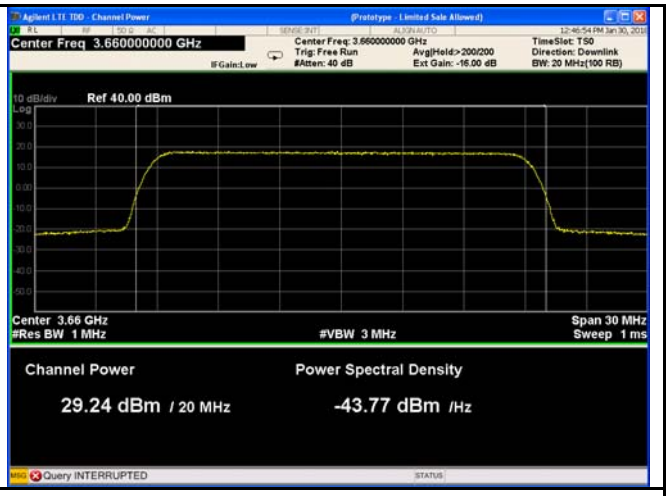


10MHz - High CH QPSK



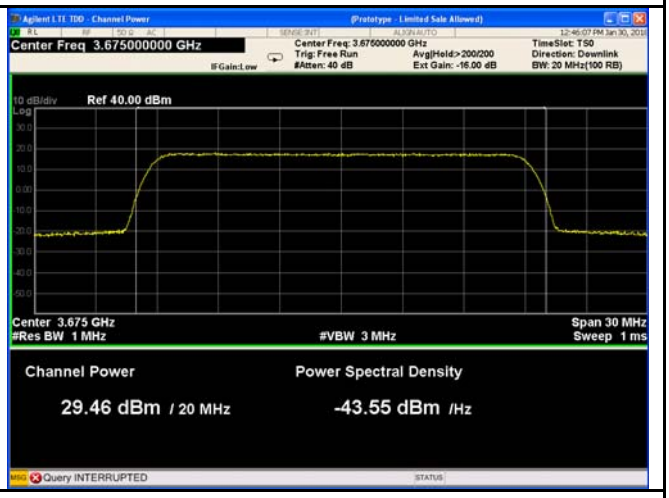
10MHz - High CH 64QAM

20MHz - Low CH QPSK

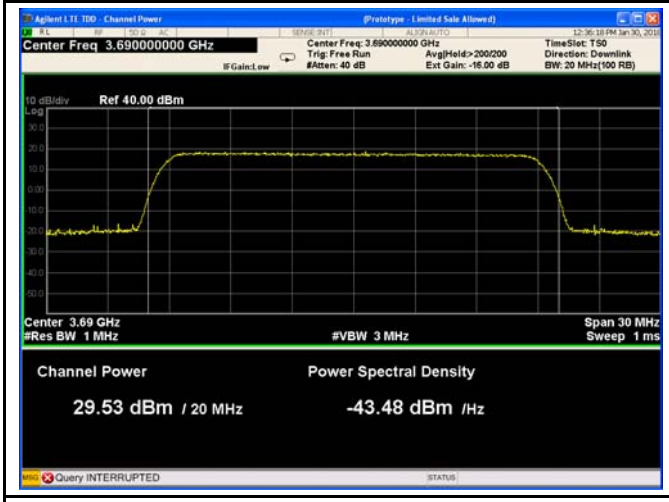


20MHz - Low CH 64QAM

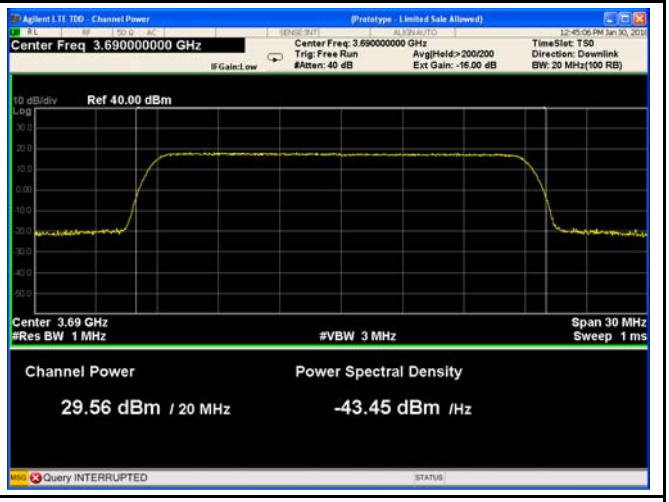
20MHz - Middle CH QPSK



20MHz - Middle CH 64QAM

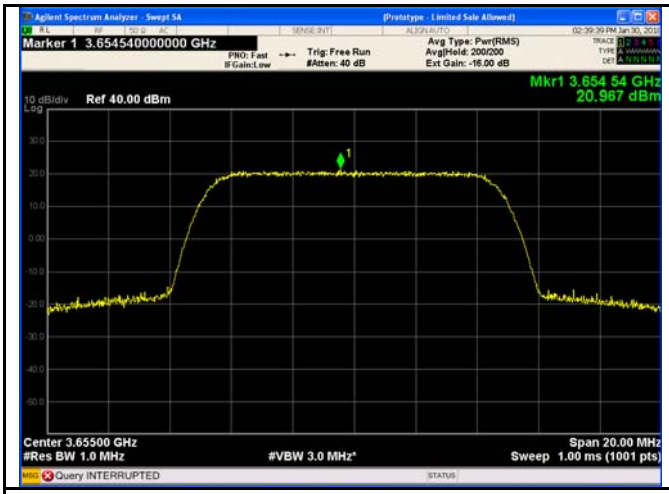


20MHz - High CH QPSK

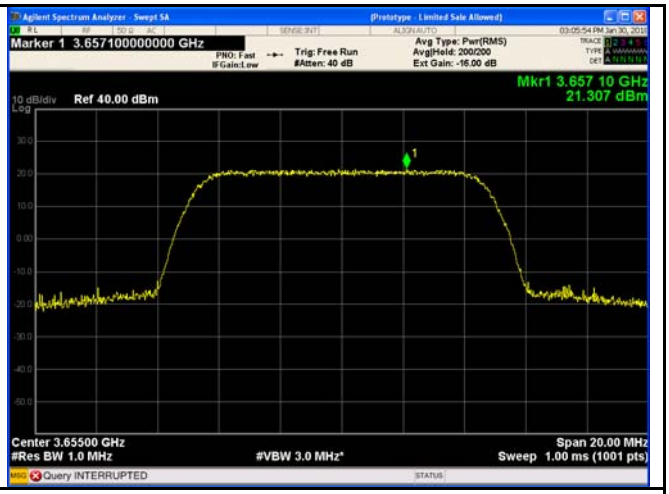


20MHz - High CH 64QAM

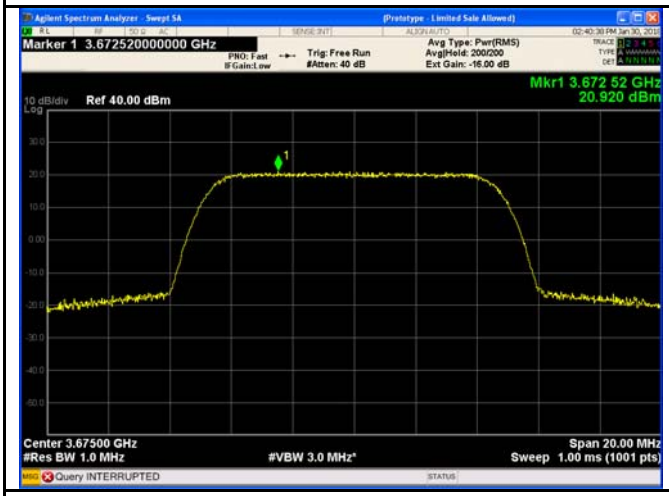
Master-PSD
Chain 2



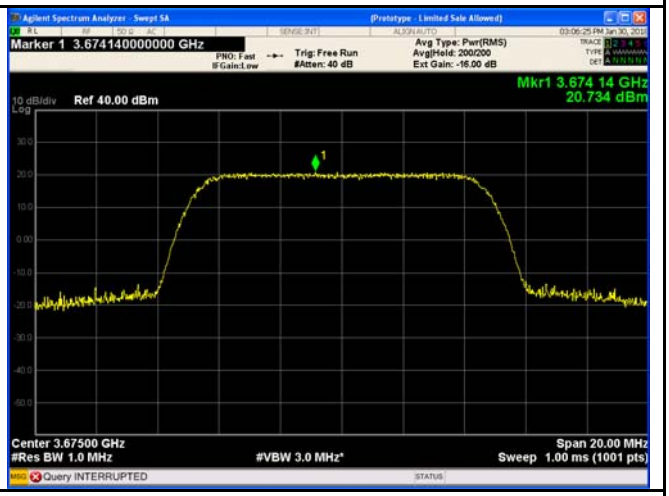
10MHz - Low CH QPSK



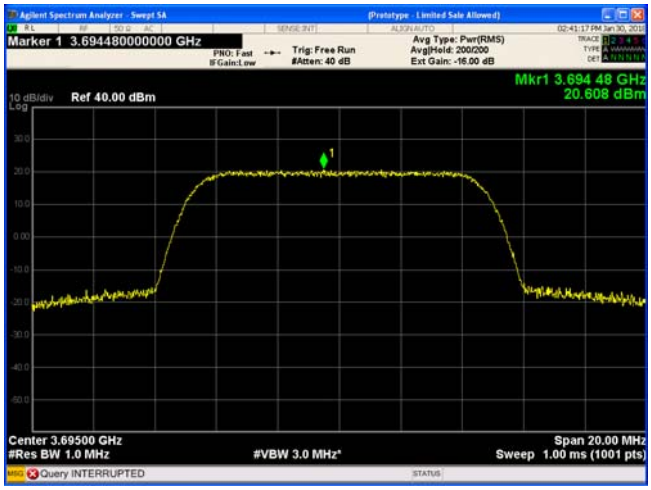
10MHz - Low CH 64QAM



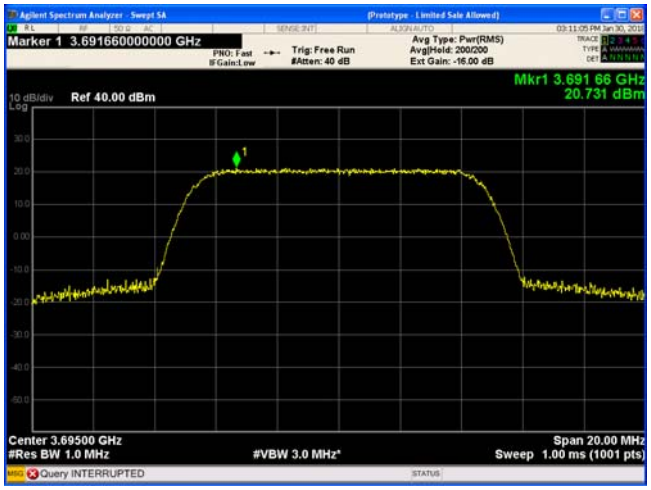
10MHz - Middle CH QPSK



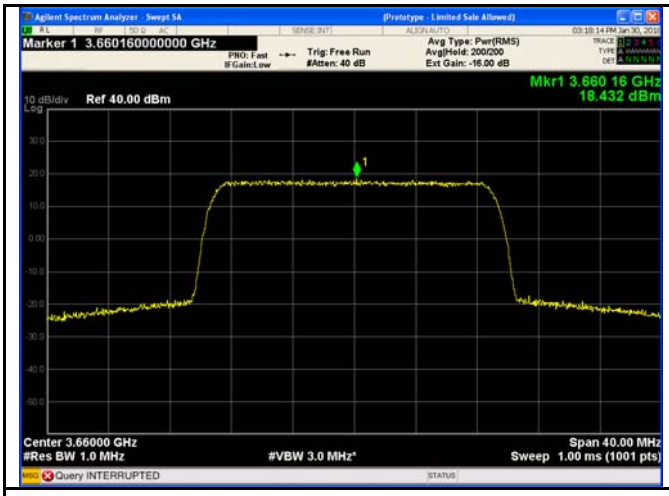
10MHz - Middle CH 64QAM



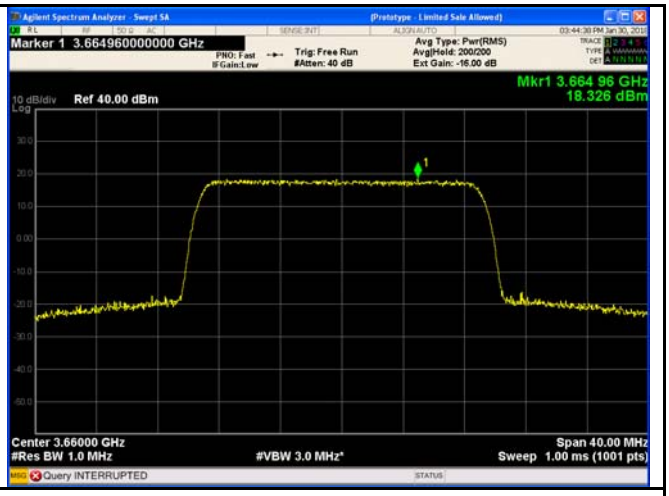
10MHz - High CH QPSK



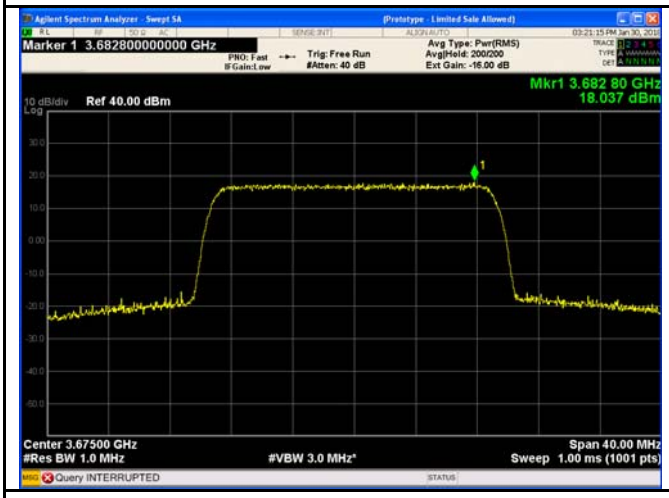
10MHz - High CH 64QAM



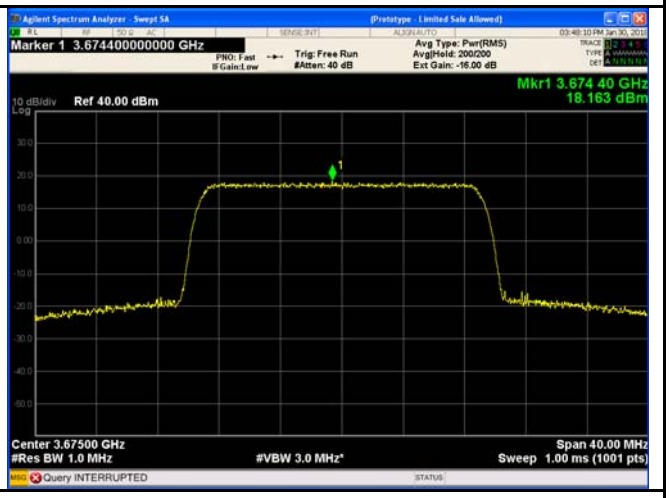
20MHz - Low CH QPSK



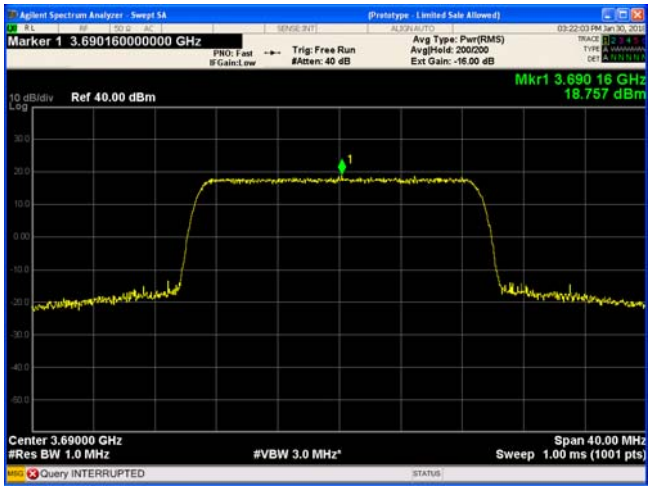
20MHz - Low CH 64QAM



20MHz - Middle CH QPSK



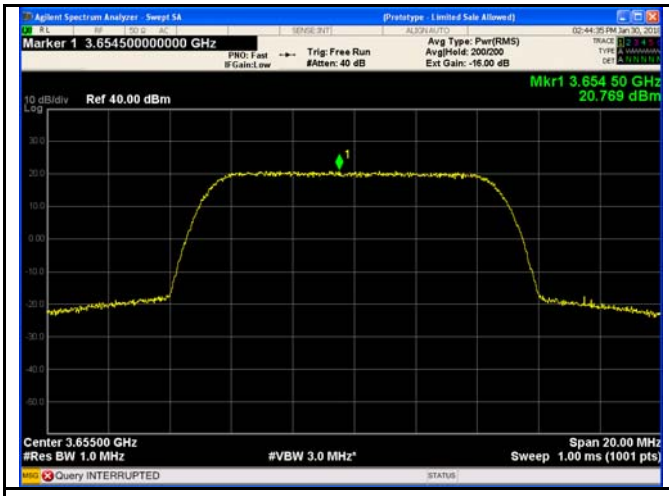
20MHz - Middle CH 64QAM



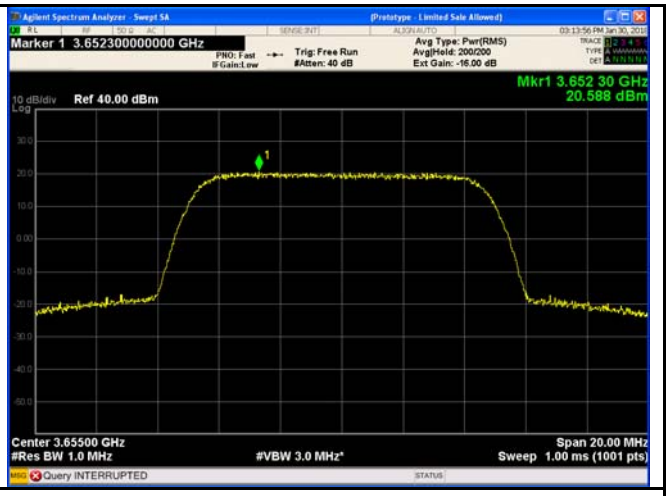
20MHz - High CH QPSK

20MHz - High CH 64QAM

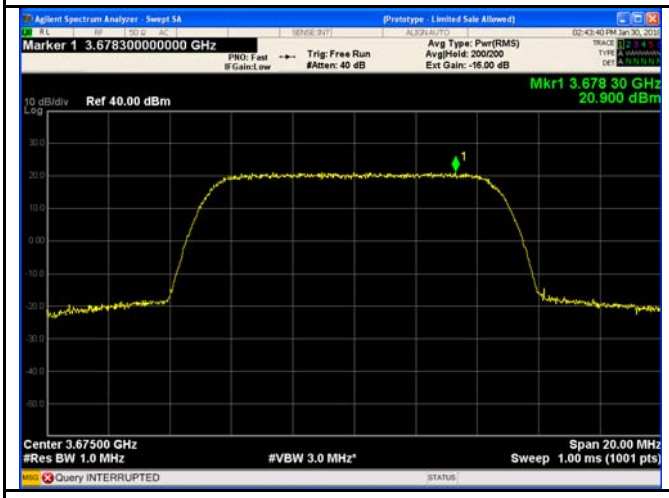
Chain 3



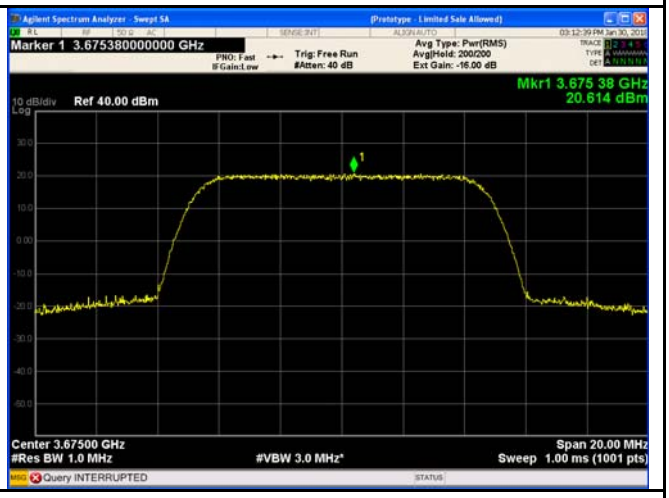
10MHz - Low CH QPSK



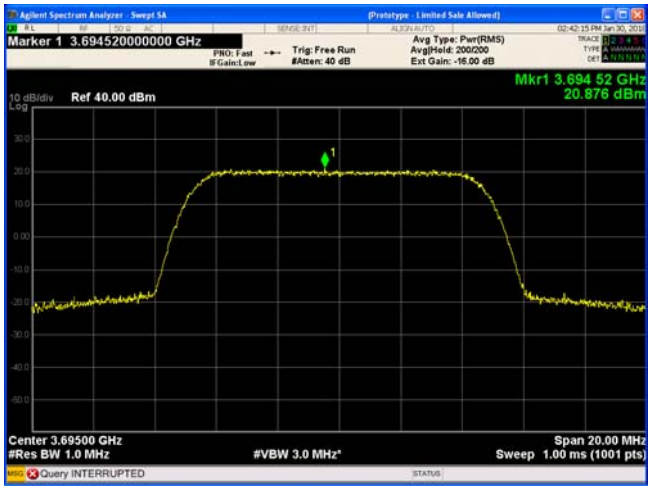
10MHz - Low CH 64QAM



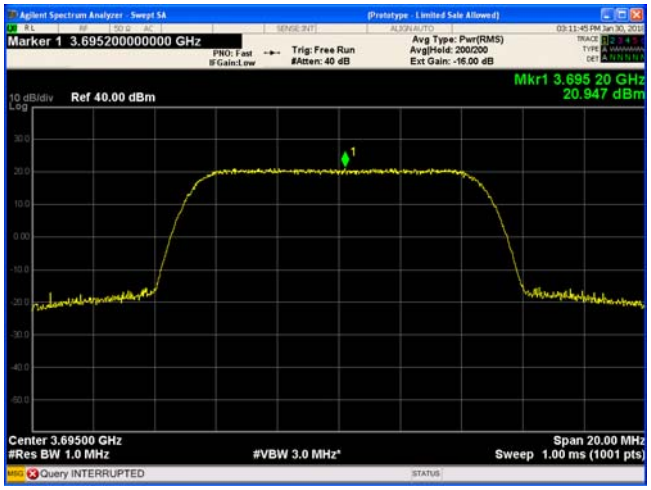
10MHz - Middle CH QPSK



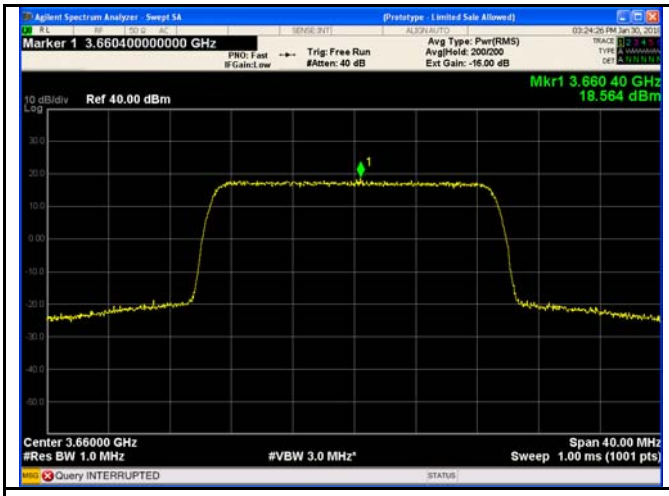
10MHz - Middle CH 64QAM



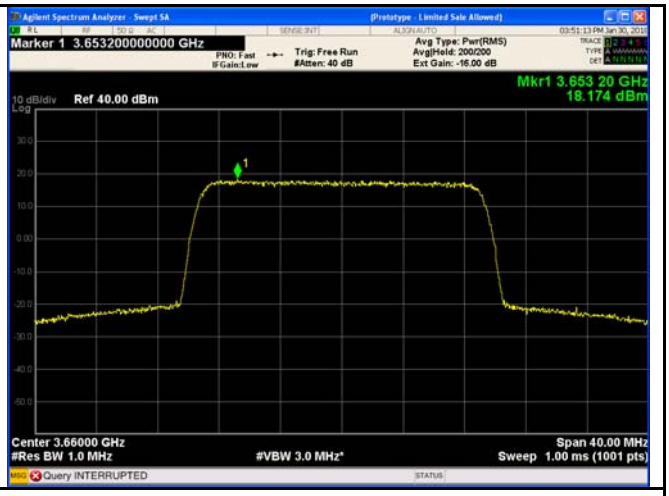
10MHz - High CH QPSK



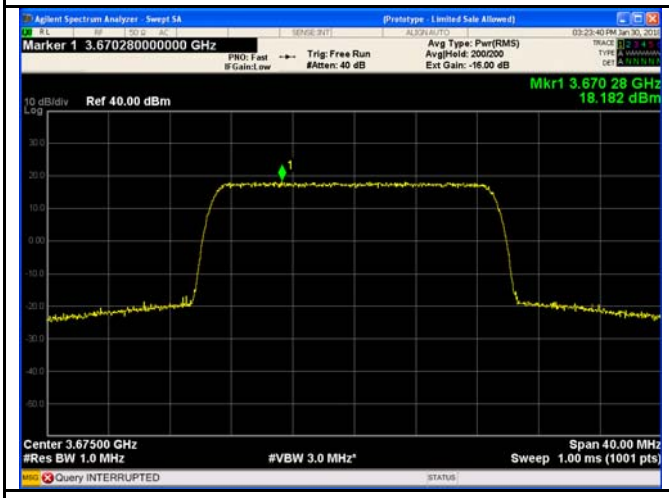
10MHz - High CH 64QAM



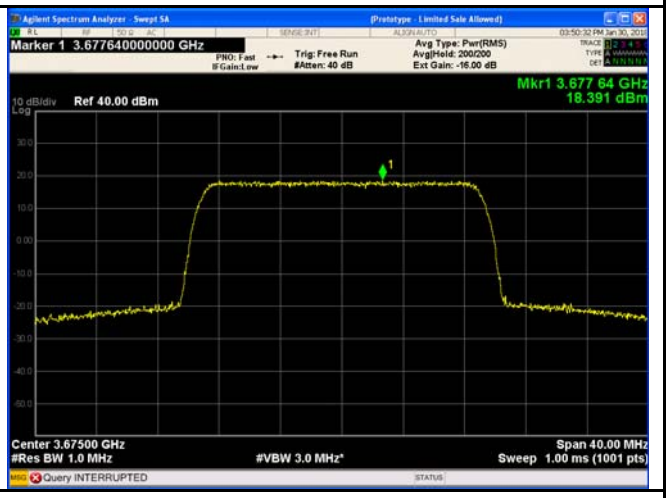
20MHz - Low CH QPSK



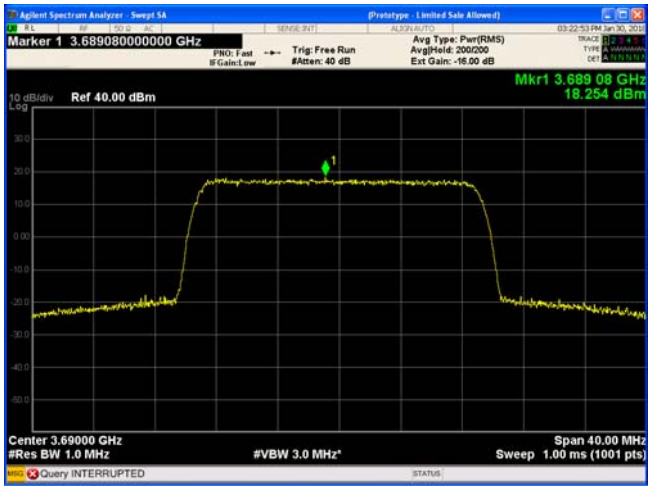
20MHz - Low CH 64QAM



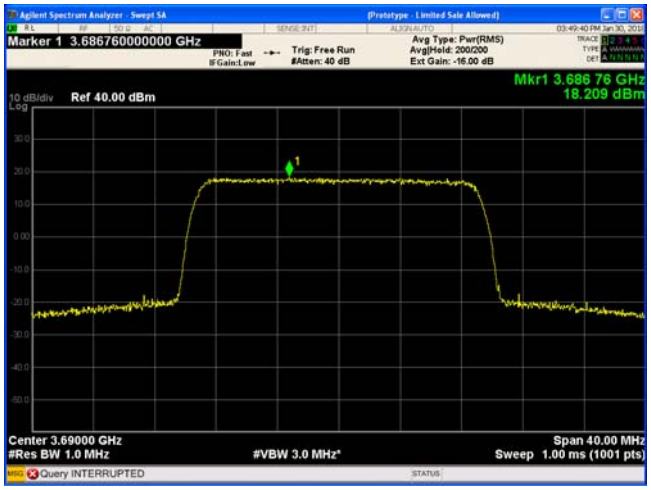
20MHz - Middle CH QPSK



20MHz - Middle CH 64QAM



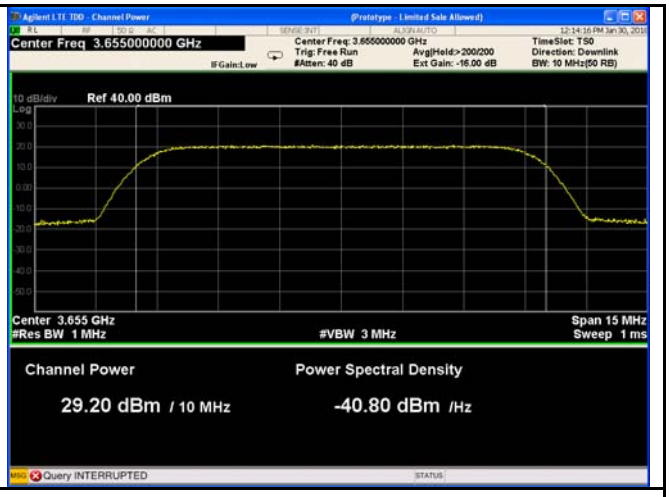
20MHz - High CH QPSK



20MHz - High CH 64QAM

Slave-Output Power at antenna terminal
Chain 0

10MHz - Low CH QPSK

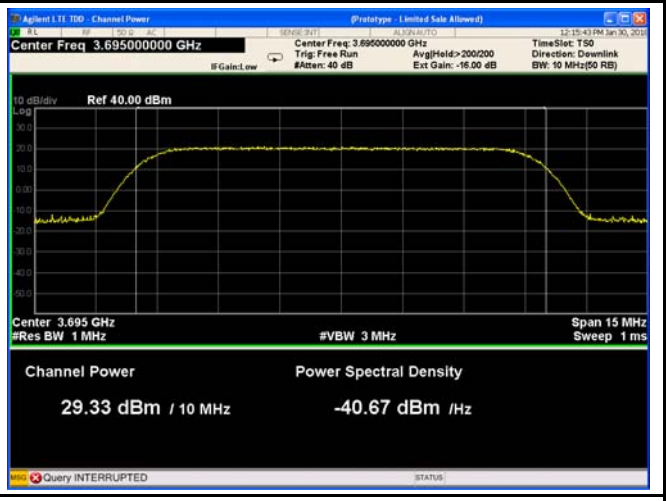


10MHz - Low CH 64QAM

10MHz - Middle CH QPSK

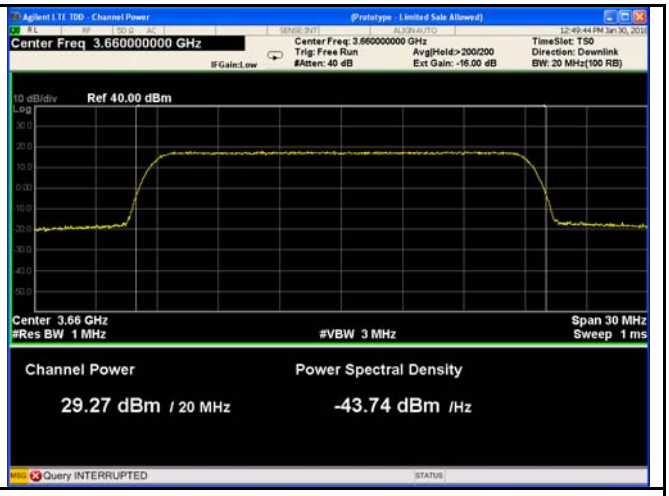
10MHz - Middle CH 64QAM

10MHz - High CH QPSK



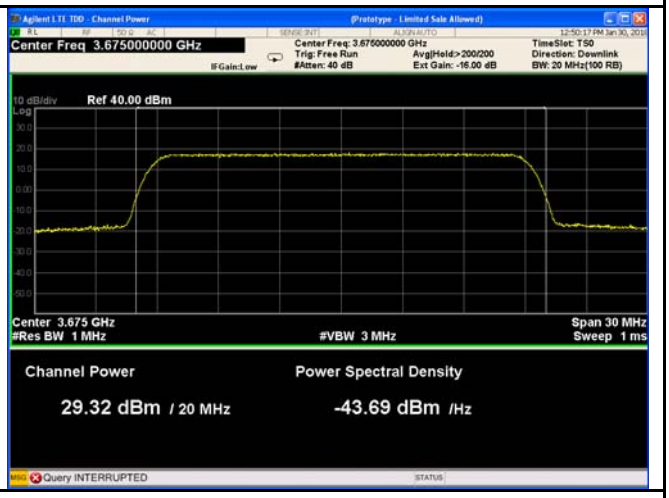
10MHz - High CH 64QAM

20MHz - Low CH QPSK



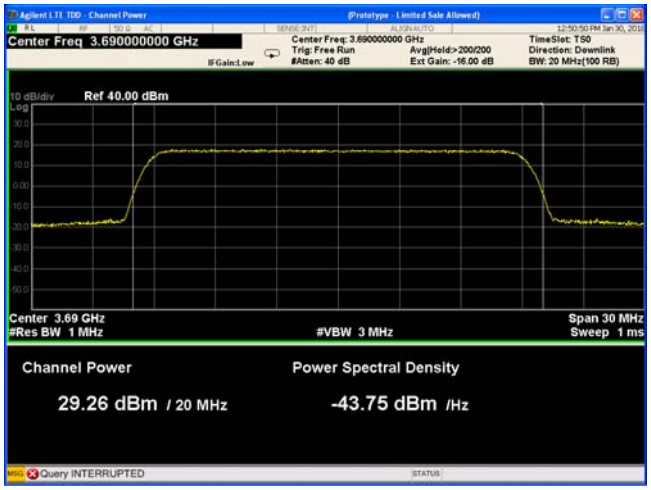
20MHz - Low CH 64QAM

20MHz - Middle CH QPSK



20MHz - Middle CH 64QAM

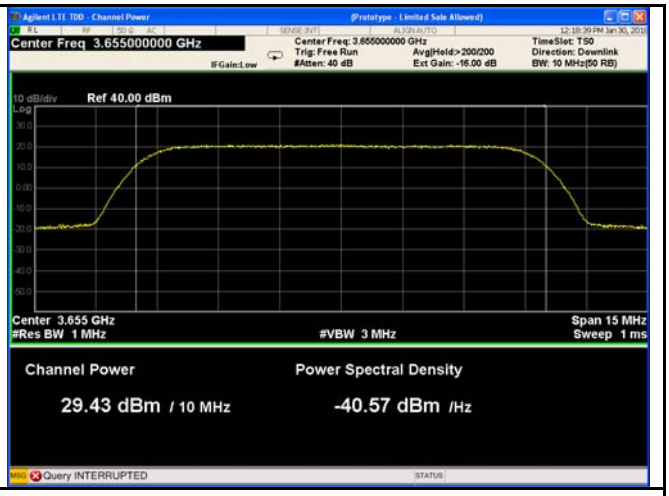
20MHz - High CH QPSK



20MHz - High CH 64QAM

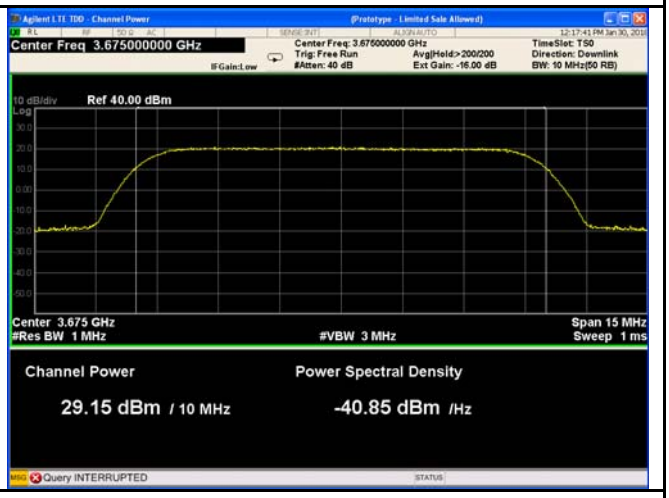
Chain 1

10MHz - Low CH QPSK

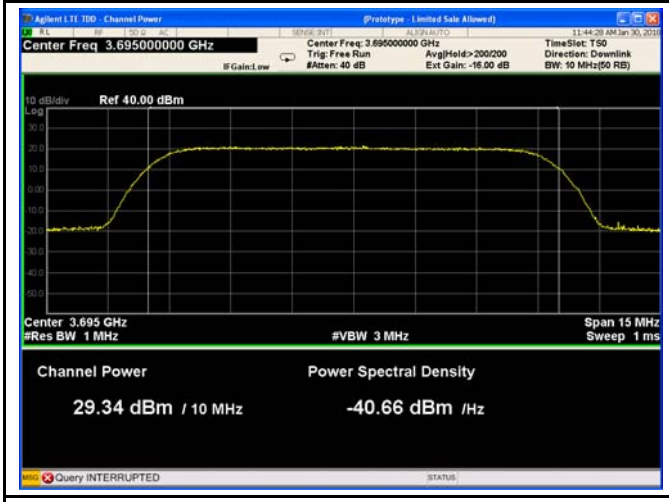


10MHz - Low CH 64QAM

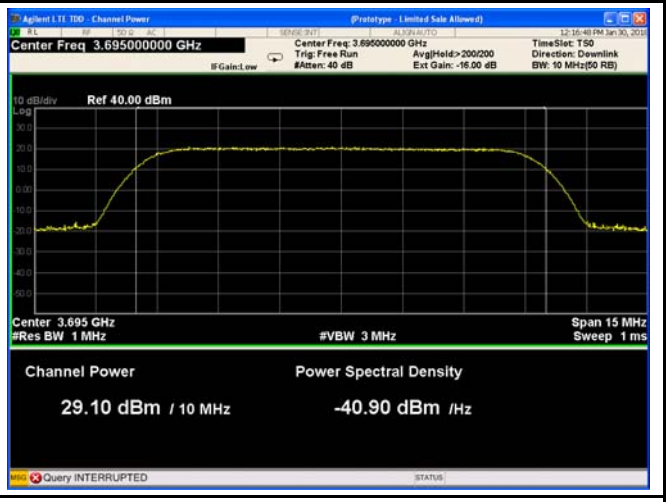
10MHz - Middle CH QPSK



10MHz - Middle CH 64QAM

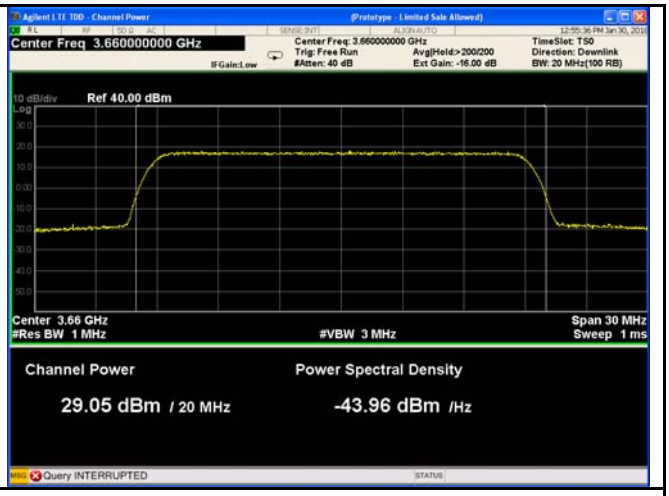


10MHz - High CH QPSK



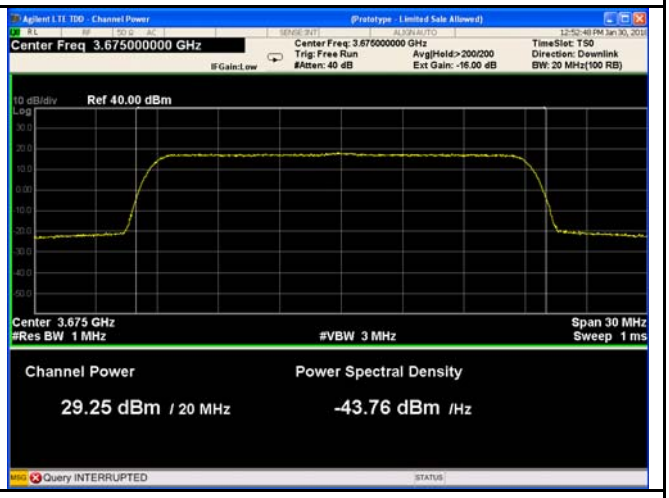
10MHz - High CH 64QAM

20MHz - Low CH QPSK

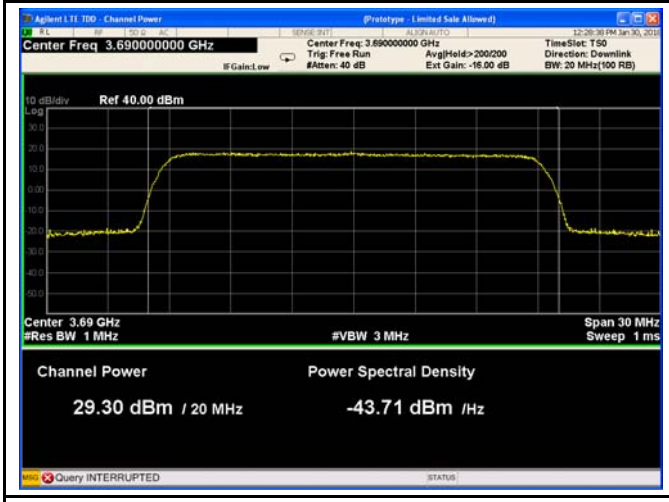


20MHz - Low CH 64QAM

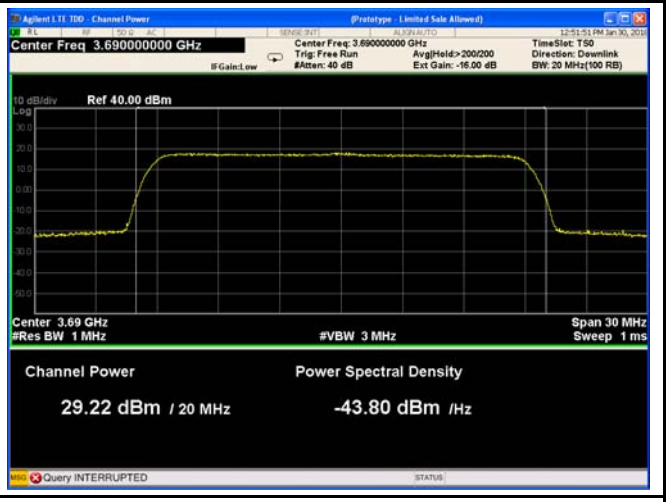
20MHz - Middle CH QPSK



20MHz - Middle CH 64QAM

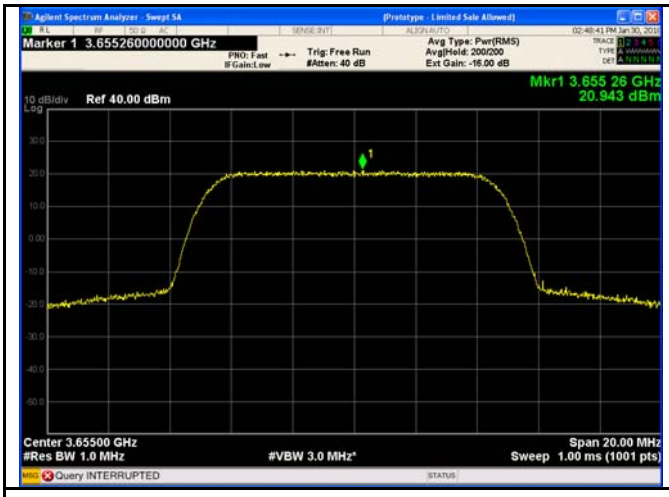


20MHz - High CH QPSK

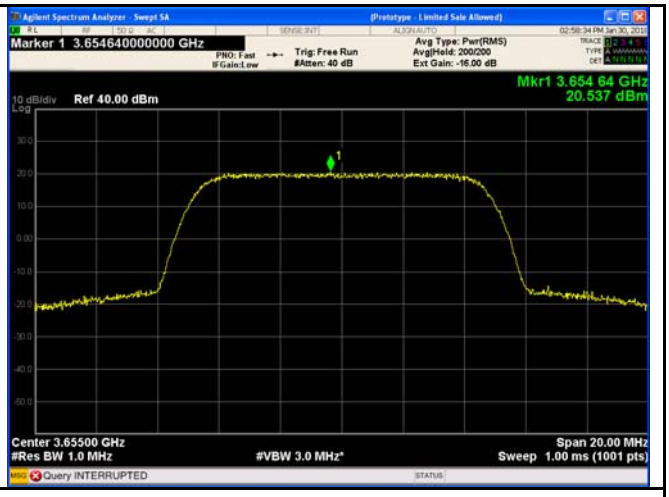


20MHz - High CH 64QAM

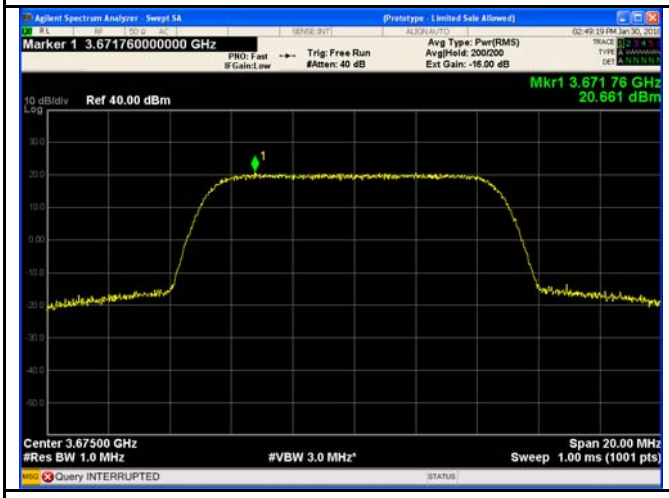
Slave-PSD
Chain 0



10MHz - Low CH QPSK

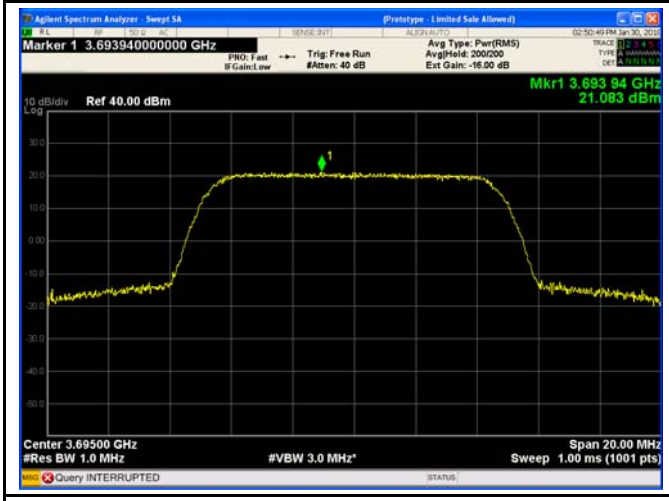


10MHz - Low CH 64QAM

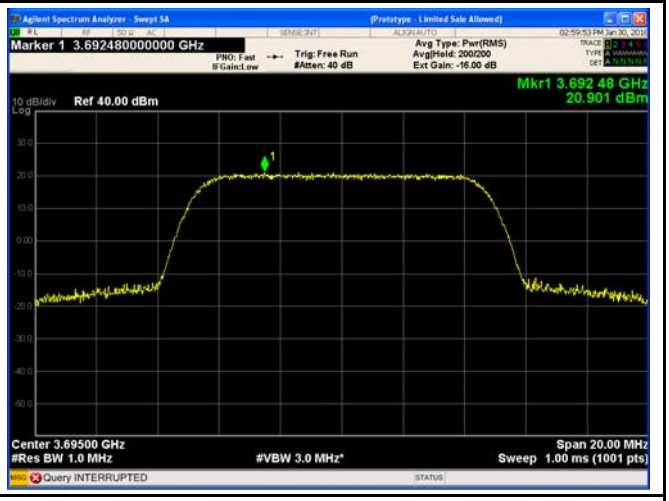


10MHz - Middle CH QPSK

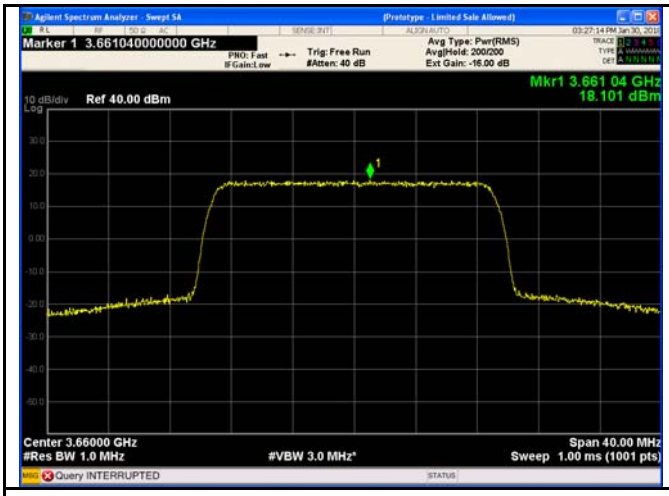
10MHz - Middle CH 64QAM



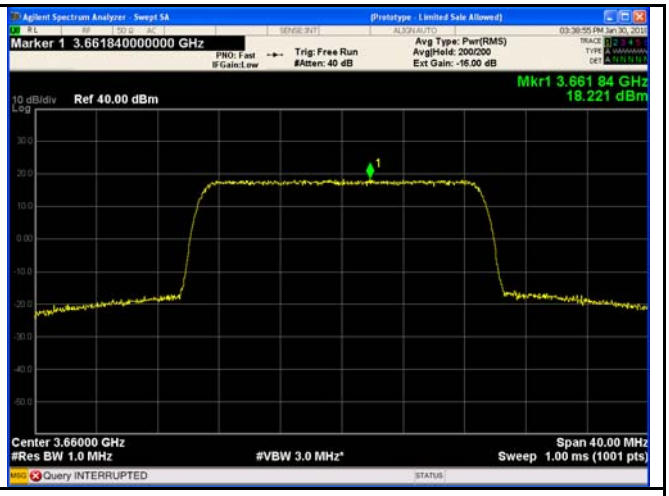
10MHz - High CH QPSK



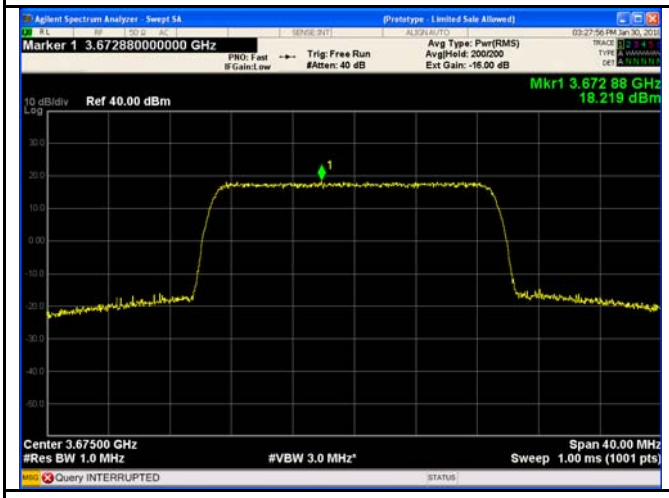
10MHz - High CH 64QAM



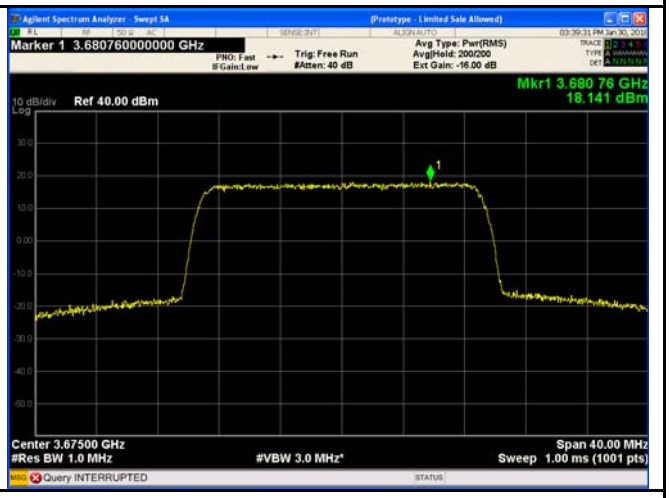
20MHz - Low CH QPSK



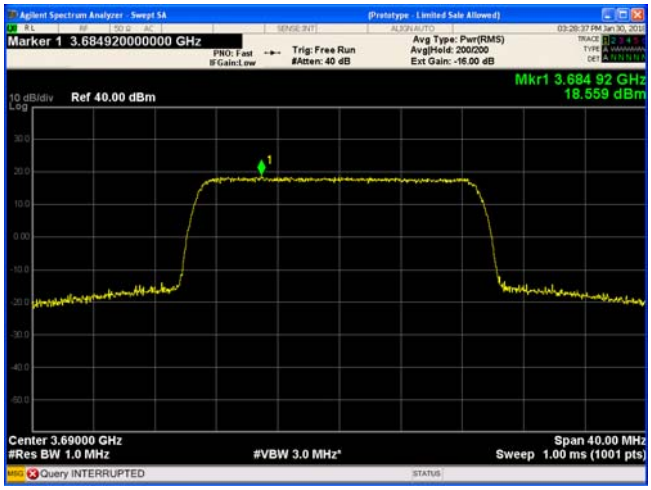
20MHz - Low CH 64QAM



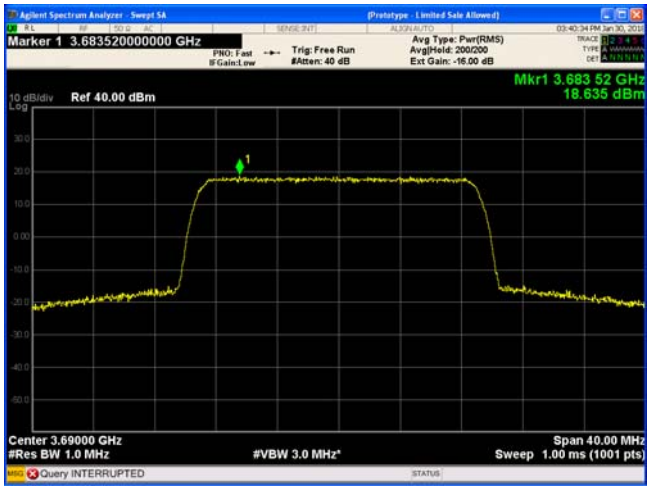
20MHz - Middle CH QPSK



20MHz - Middle CH 64QAM

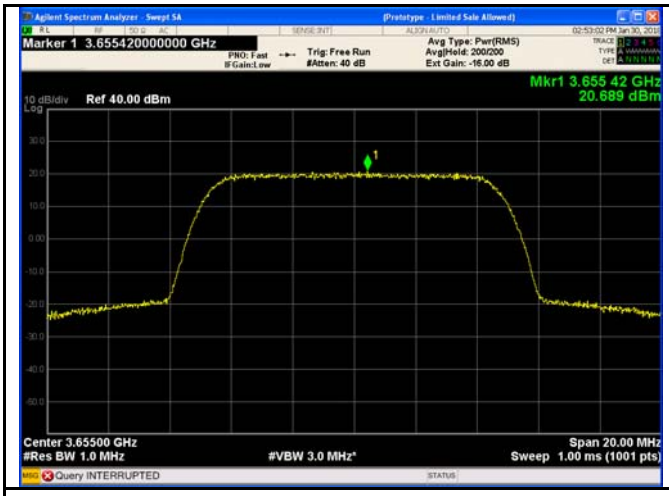


20MHz - High CH QPSK

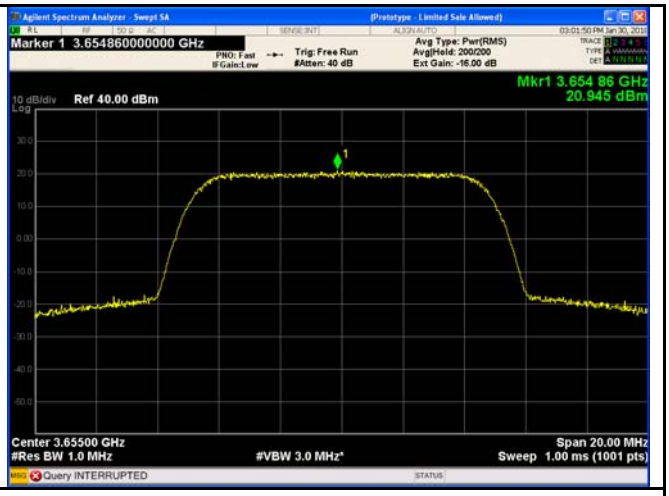


20MHz - High CH 64QAM

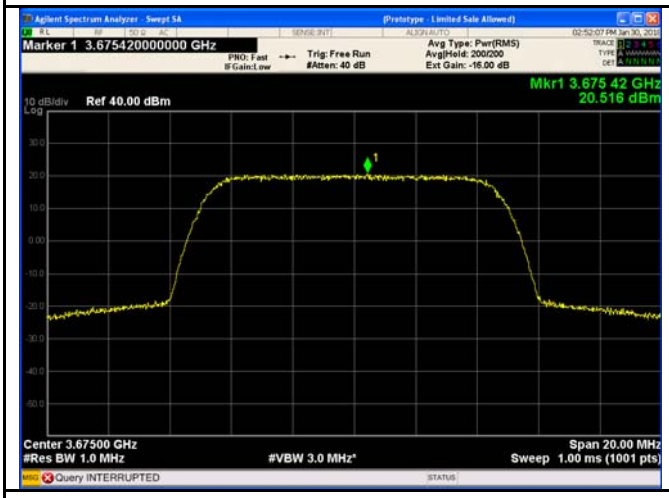
Chain 1



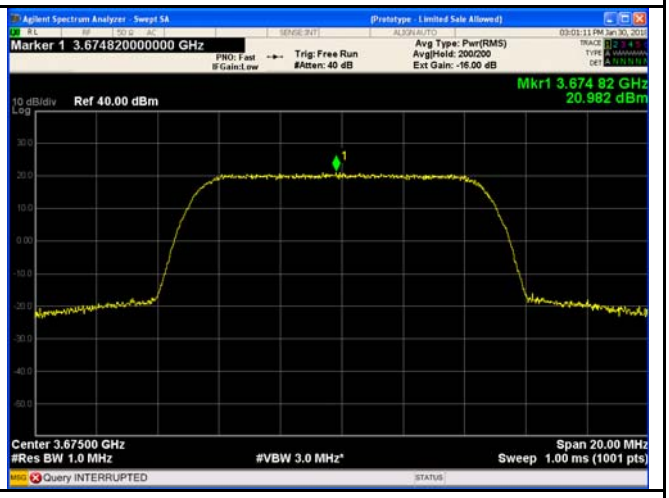
10MHz - Low CH QPSK



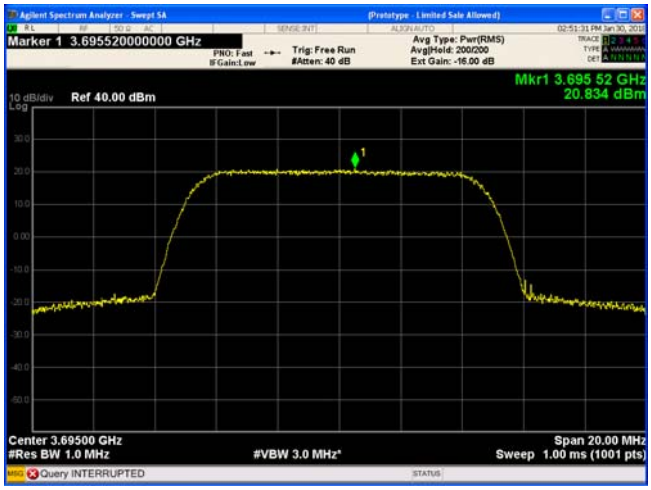
10MHz - Low CH 64QAM



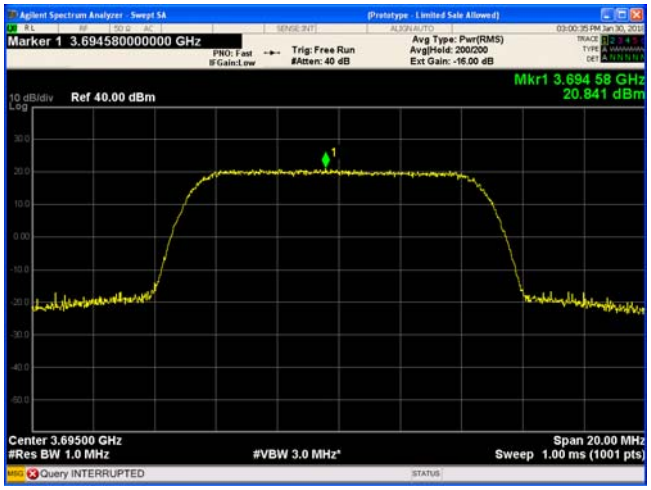
10MHz - Middle CH QPSK



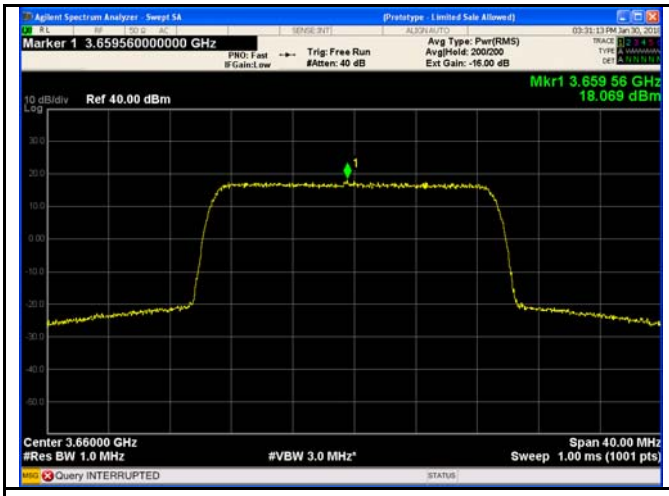
10MHz - Middle CH 64QAM



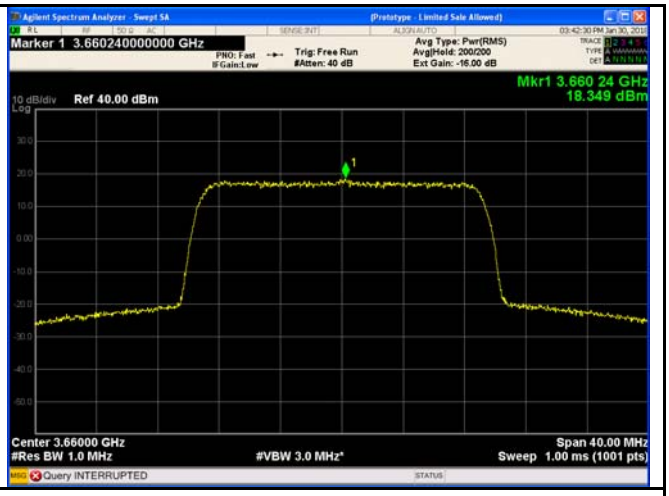
10MHz - High CH QPSK



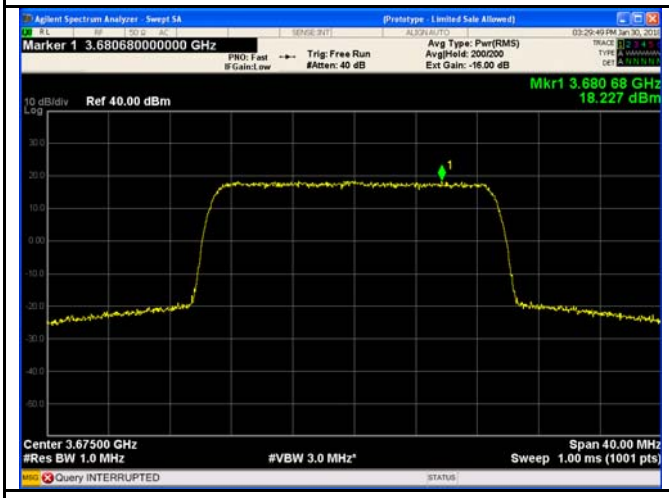
10MHz - High CH 64QAM



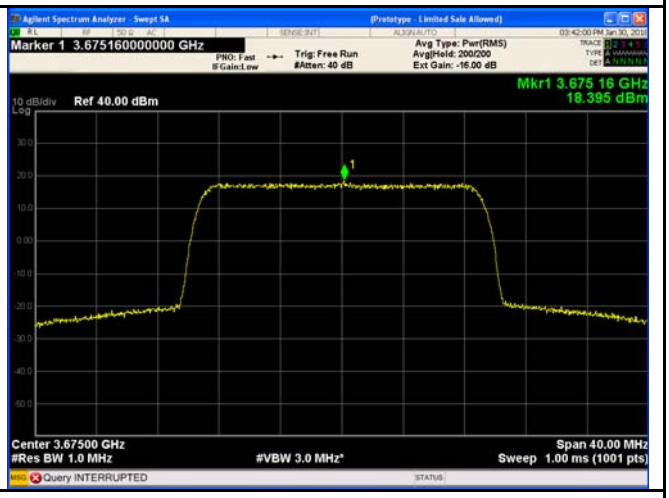
20MHz - Low CH QPSK



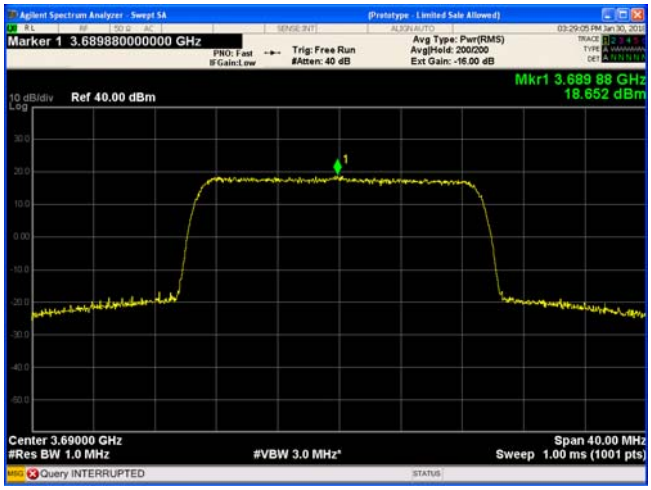
20MHz - Low CH 64QAM



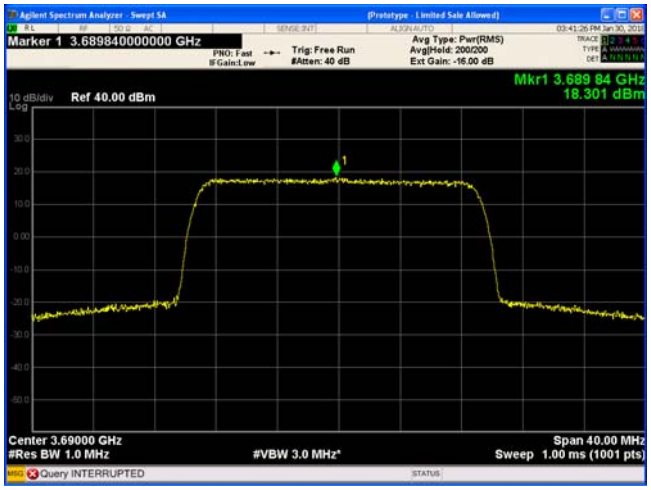
20MHz - Middle CH QPSK



20MHz - Middle CH 64QAM



20MHz - High CH QPSK



20MHz - High CH 64QAM

9 Occupy Bandwidth

Test Requirement:	FCC part 90.209
Test Method:	FCC part 2.1049
	ANSI C63.26-2015
Test Mode:	Data communicating mode

9.1 EUT Operation

Operating Environment :

Temperature:	22.5 °C
Humidity:	52.3% RH
Atmospheric Pressure:	101.2kPa

9.2 Test Procedure

1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer.

2. The transmitter shall be operated at its maximum carrier powermeasured under normal test conditions.

3. The span of the analyzer shall be set to capture all products of themodulation process, including the emission skirts.

4. The resolution bandwidth (RBW) shall be in the range of 1% to 5% ofthe occupied bandwidth (OBW) and video bandwidth (VBW) shall beapproximately 3x RBW.

9.3 Test Result

Master-Chain 2

Bandwidth (MHz)	Modulation	Test Channel	26dB Occupy bandwidth (MHz)	99% Occupy bandwidth (MHz)
10	QPSK	Low	9.364	8.939
		Middle	9.422	8.940
		High	9.405	8.934
	64QAM	Low	9.394	8.940
		Middle	9.450	8.934
		High	9.412	8.943
Bandwidth (MHz)	**Modulation**	**Test Channel**	**26dB Occupy bandwidth (MHz)**	**99% Occupy bandwidth (MHz)**
20	QPSK	Low	18.63	17.857
		Middle	18.72	17.868
		High	18.72	17.871
	64QAM	Low	18.65	17.864
		Middle	18.64	17.867
		High	18.62	17.850

Master-Chain 3

Bandwidth (MHz)	Modulation	Test Channel	26dB Occupy bandwidth (MHz)	99% Occupy bandwidth (MHz)
10	QPSK	Low	9.397	8.945
		Middle	9.423	8.937
		High	9.407	8.939
	64QAM	Low	9.424	8.936
		Middle	9.432	8.936
		High	9.421	8.937
Bandwidth (MHz)	**Modulation**	**Test Channel**	**26dB Occupy bandwidth (MHz)**	**99% Occupy bandwidth (MHz)**
20	QPSK	Low	18.65	17.858
		Middle	18.74	17.860
		High	18.68	17.854
	64QAM	Low	18.63	17.863
		Middle	18.57	17.861
		High	18.58	17.850

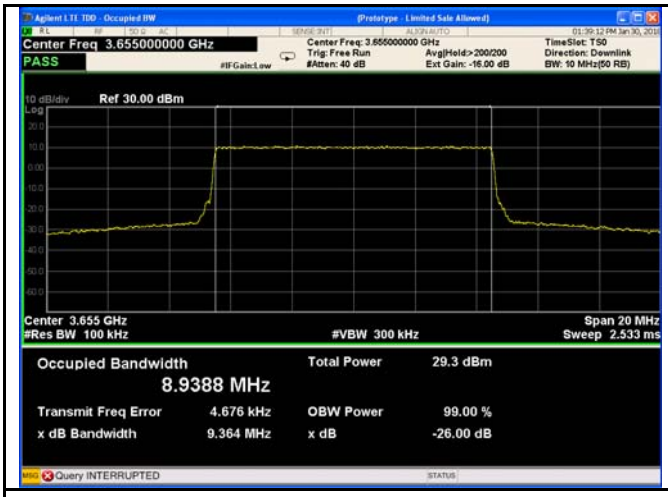
Slave-Chain 0

Bandwidth (MHz)	Modulation	Test Channel	26dB Occupy bandwidth (MHz)	99% Occupy bandwidth (MHz)
10	QPSK	Low	9.417	8.934
		Middle	9.409	8.935
		High	9.396	8.938
	64QAM	Low	9.418	8.936
		Middle	9.402	8.941
		High	9.446	8.944
Bandwidth (MHz)	**Modulation**	**Test Channel**	**26dB Occupy bandwidth (MHz)**	**99% Occupy bandwidth (MHz)**
20	QPSK	Low	18.65	17.859
		Middle	18.80	17.873
		High	18.61	17.862
	64QAM	Low	18.60	17.865
		Middle	18.58	17.858
		High	18.70	17.865

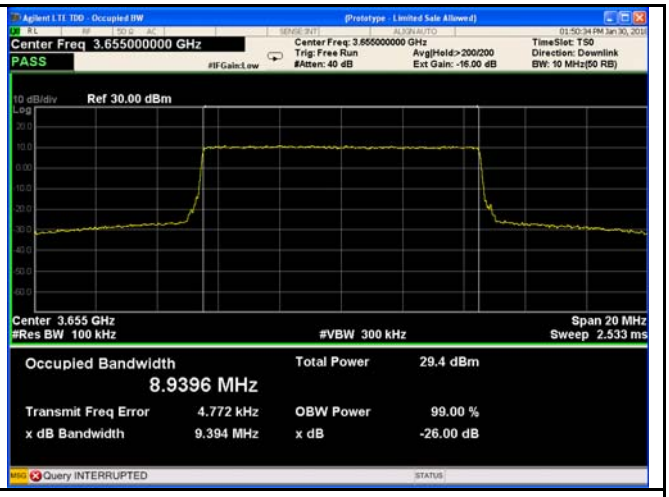
Slave-Chain 1

Bandwidth (MHz)	Modulation	Test Channel	26dB Occupy bandwidth (MHz)	99% Occupy bandwidth (MHz)
10	QPSK	Low	9.324	8.929
		Middle	9.309	8.939
		High	9.313	8.933
	64QAM	Low	9.383	8.938
		Middle	9.331	8.932
		High	9.351	8.939
Bandwidth (MHz)	**Modulation**	**Test Channel**	**26dB Occupy bandwidth (MHz)**	**99% Occupy bandwidth (MHz)**
20	QPSK	Low	18.54	17.860
		Middle	18.54	17.854
		High	18.55	17.846
	64QAM	Low	18.58	17.866
		Middle	18.53	17.867
		High	18.57	17.854

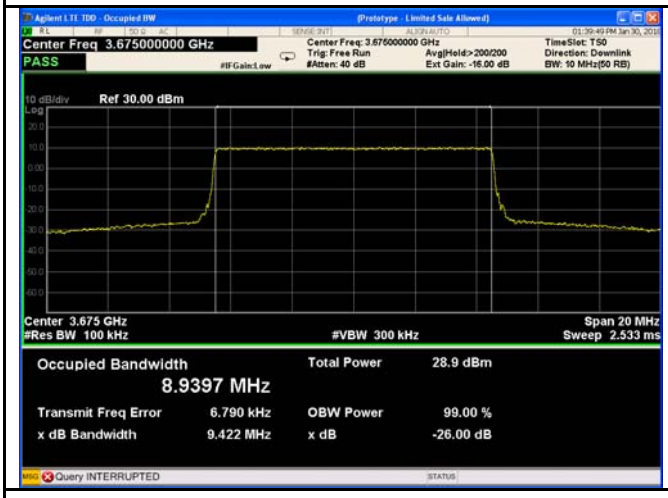
Test Plots
Master-Chain 2



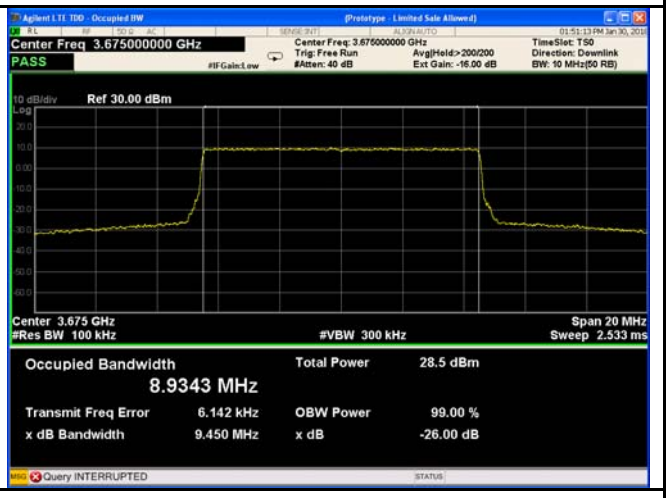
10MHz - Low CH QPSK



10MHz - Low CH 64QAM



10MHz - Middle CH QPSK



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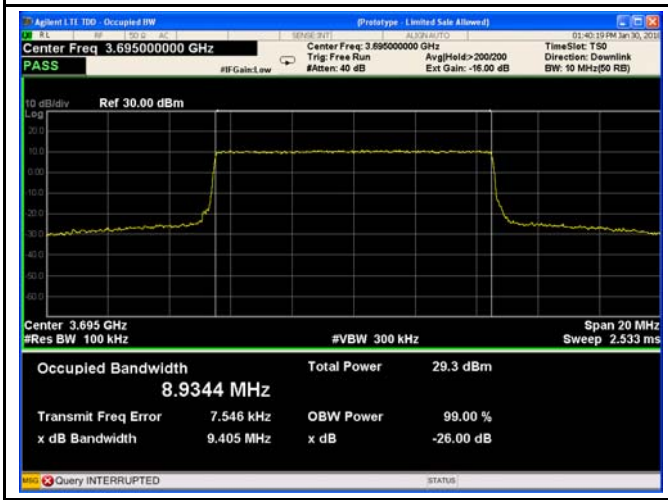

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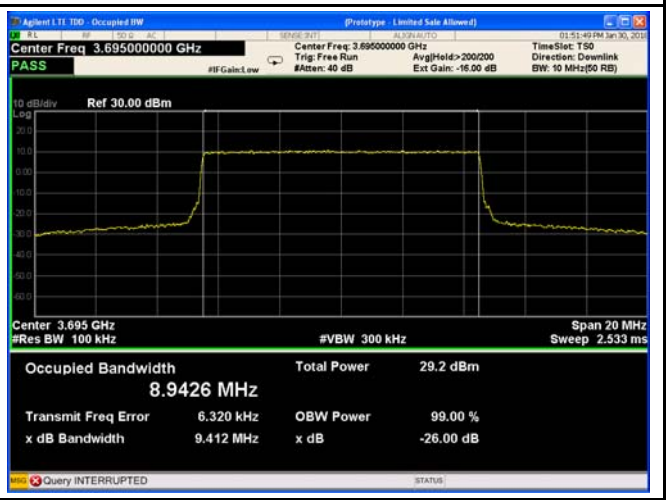

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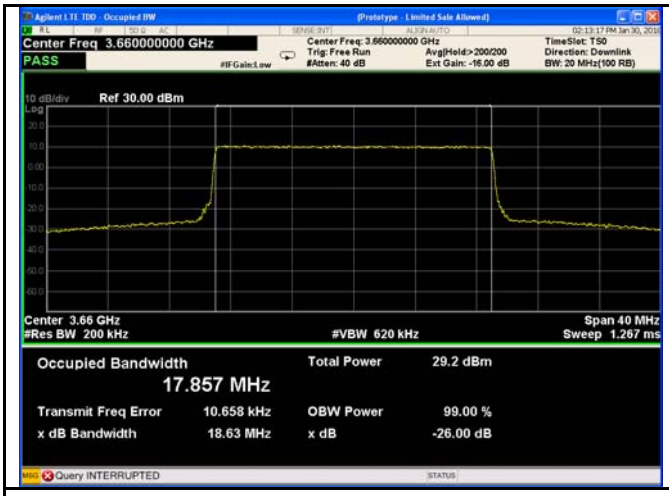

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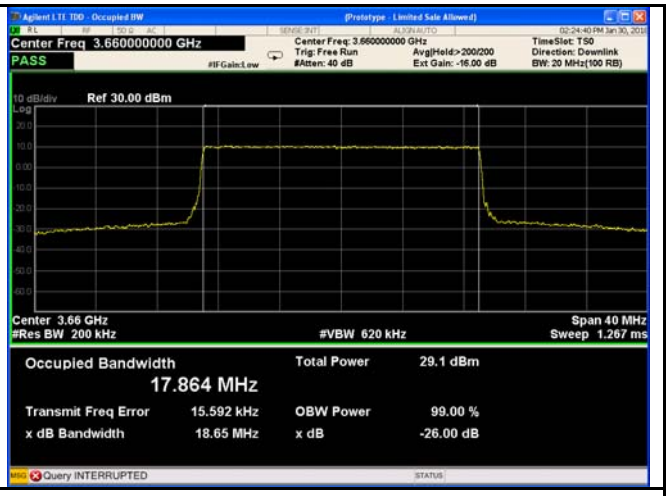

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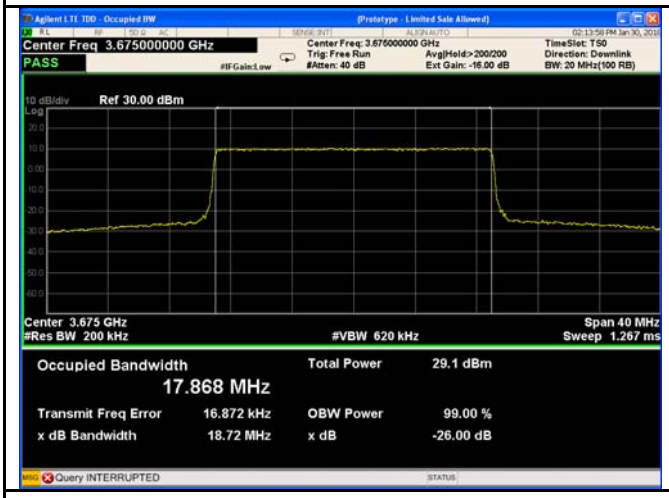
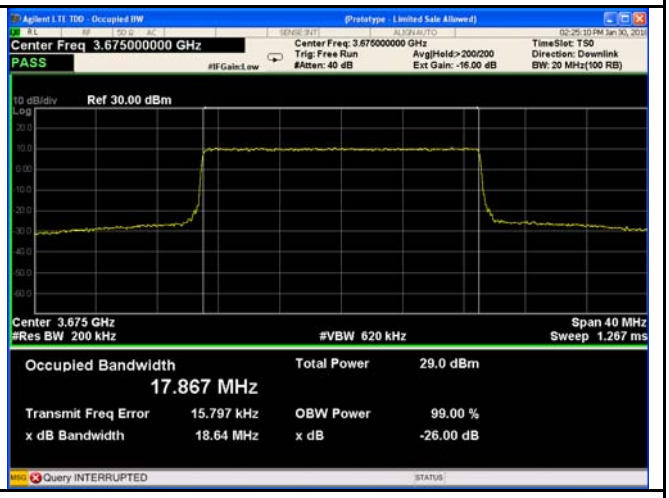
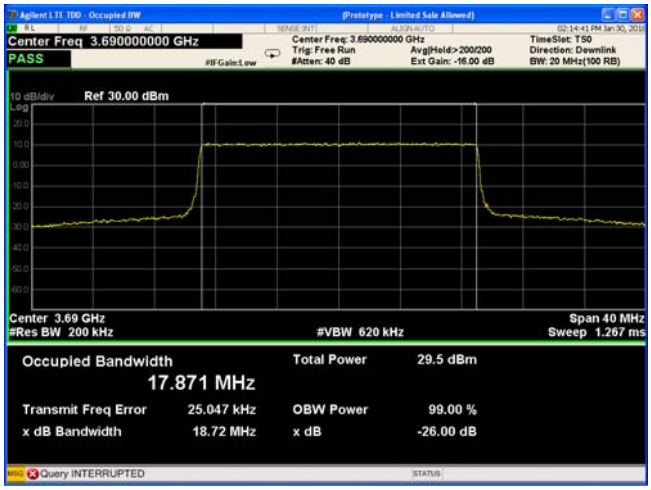


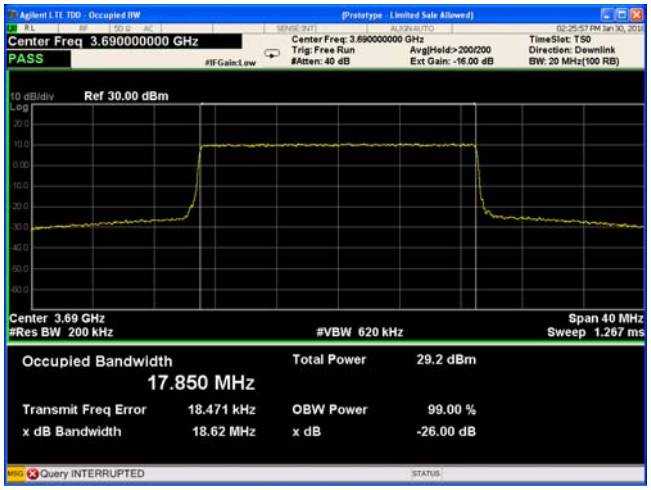
20MHz - Middle CH QPSK



20MHz - Middle CH 64QAM

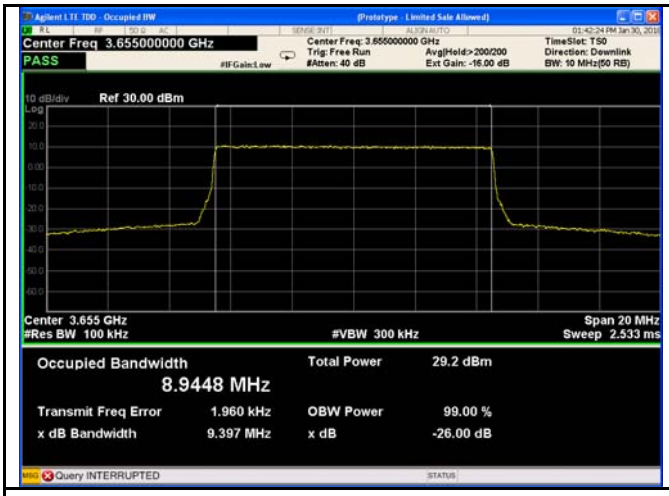


20MHz - High CH QPSK

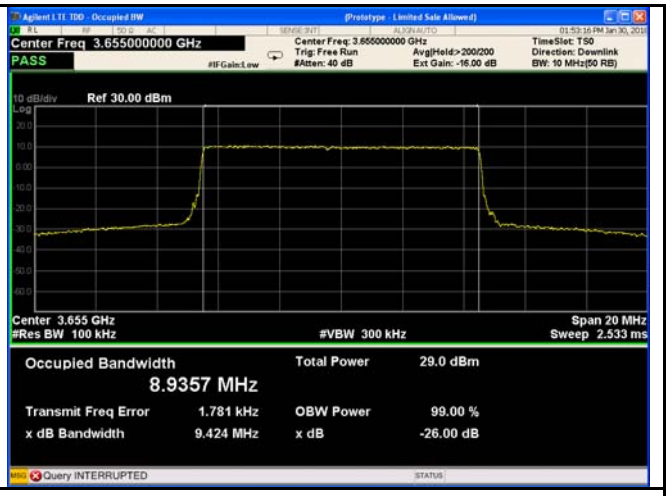


20MHz - High CH 64QAM

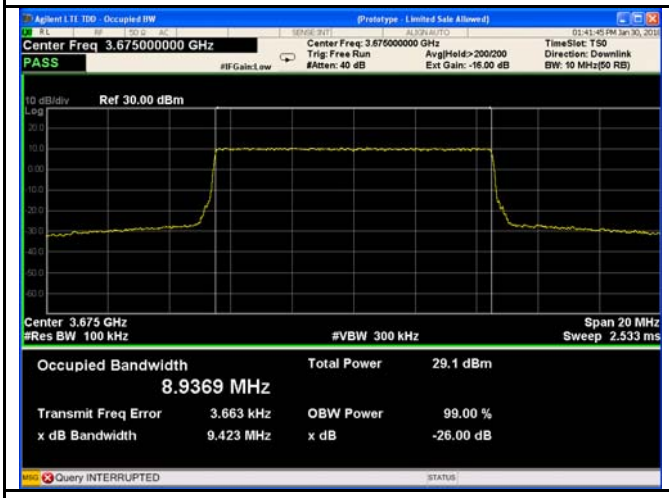
Master-Chain 3



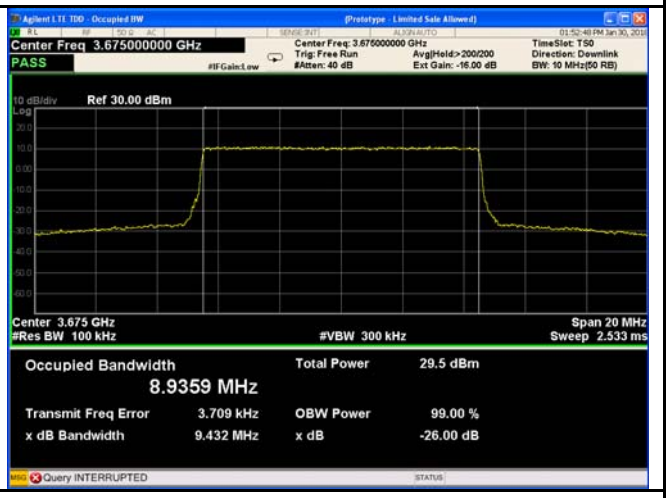
10MHz - Low CH QPSK



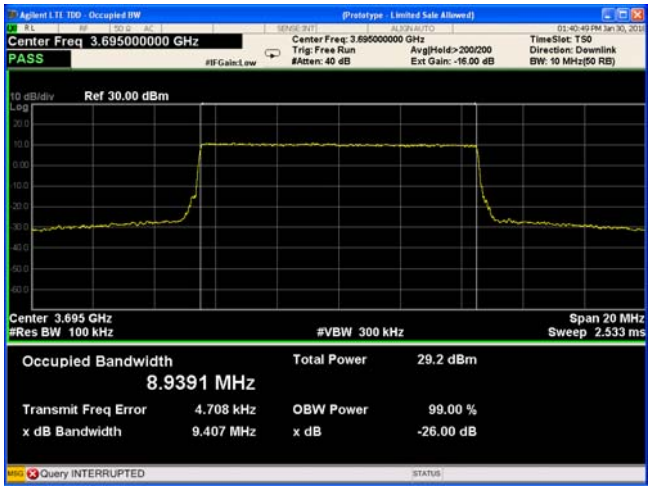
10MHz - Low CH 64QAM



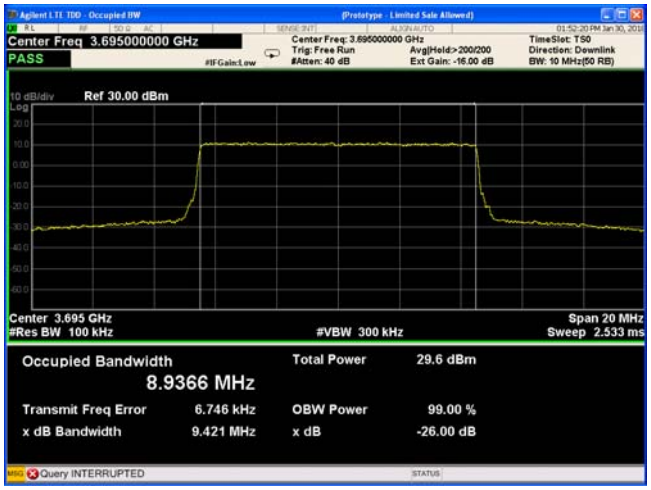
10MHz - Middle CH QPSK



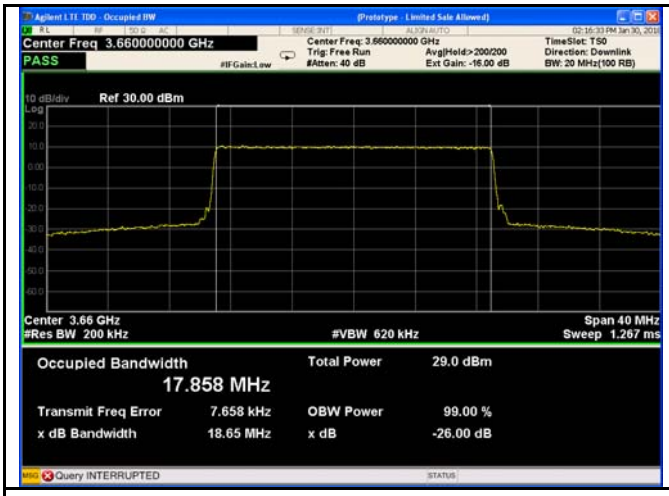
10MHz - Middle CH 64QAM



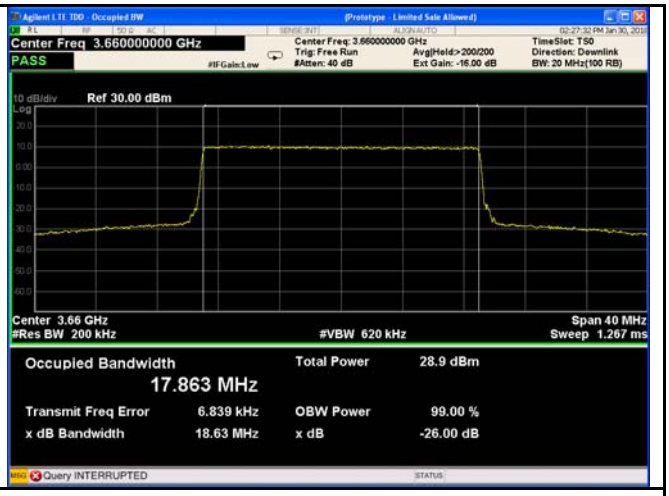
10MHz - High CH QPSK



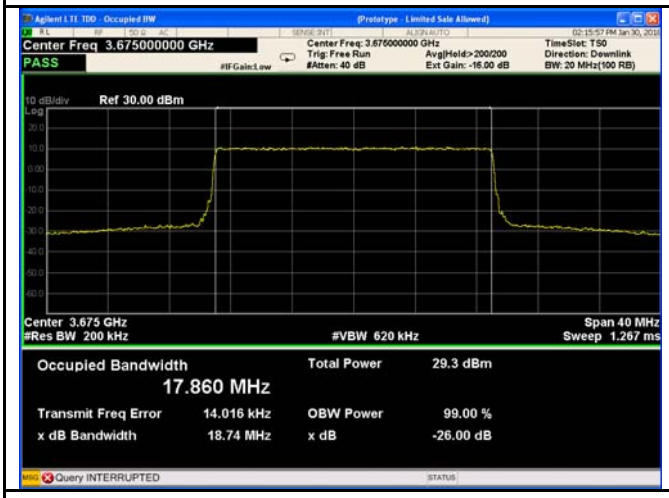
10MHz - High CH 64QAM



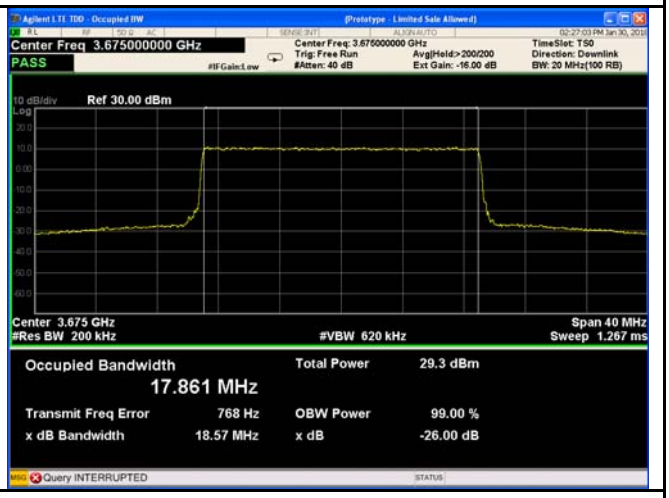
20MHz - Low CH QPSK



20MHz - Low CH 64QAM



20MHz - Middle CH QPSK



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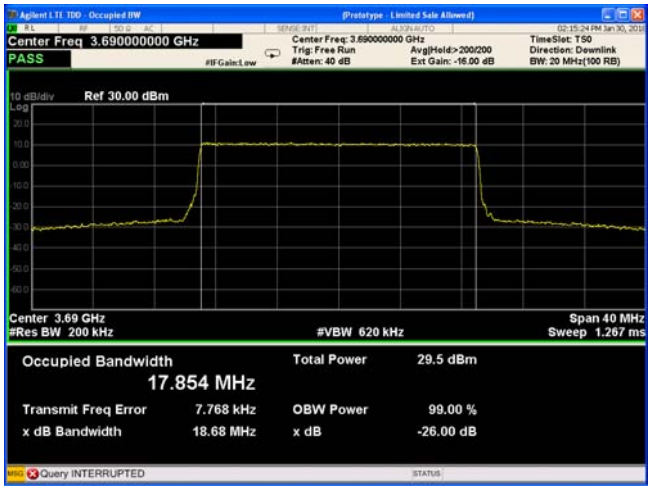
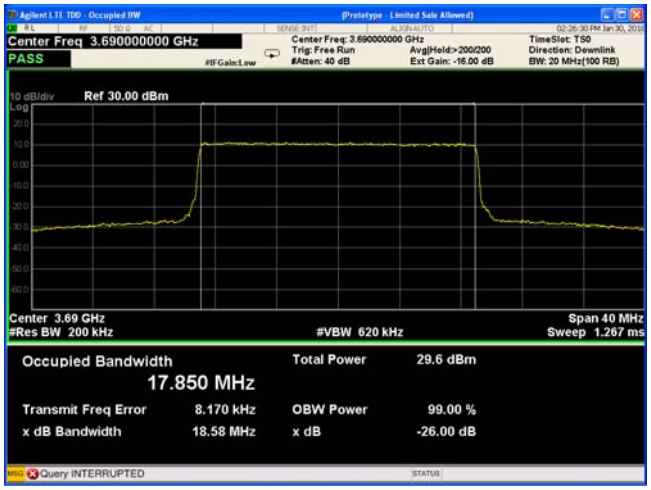
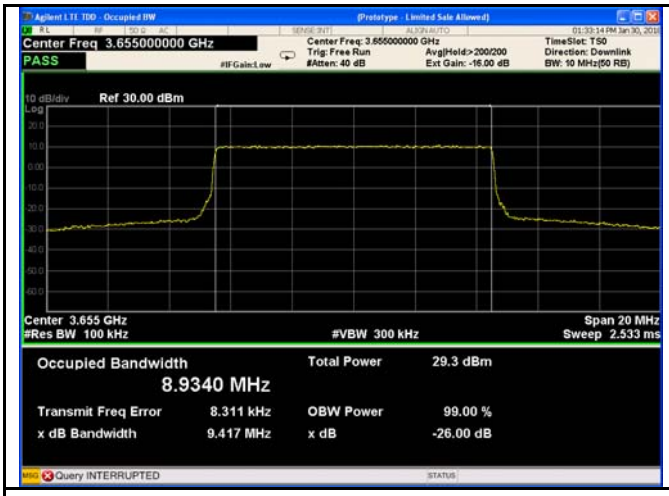


20MHz - High CH QPSK

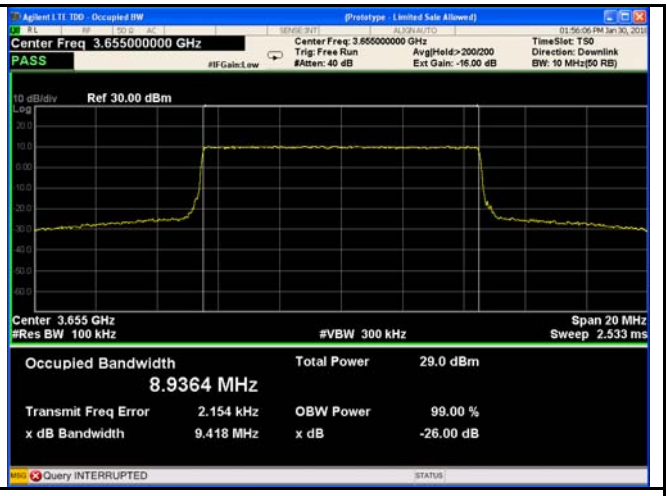


20MHz - High CH 64QAM

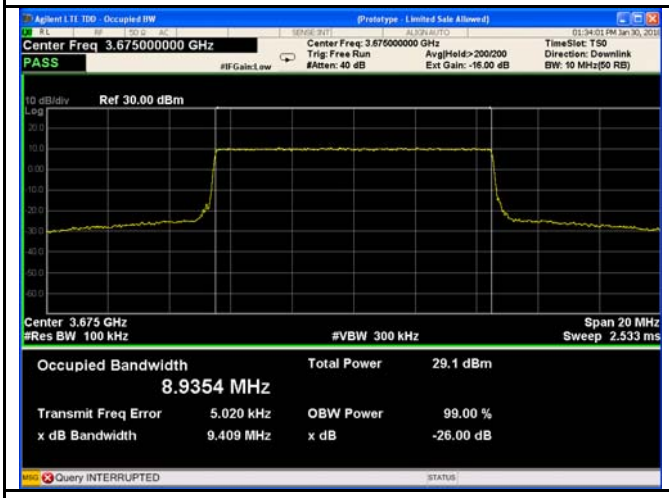
Slave-Chain 0



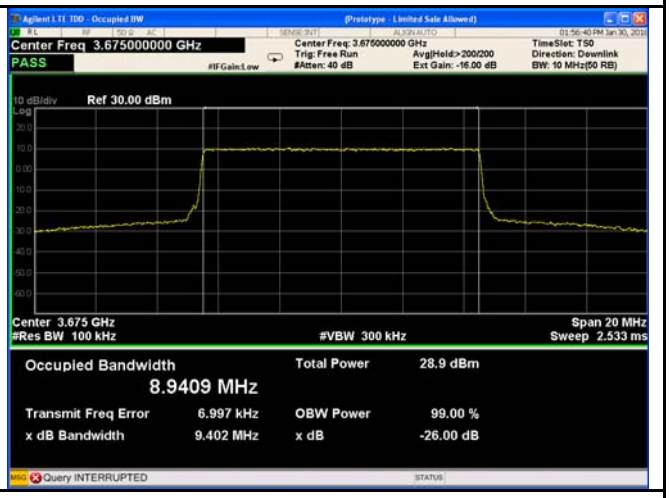
10MHz - Low CH QPSK



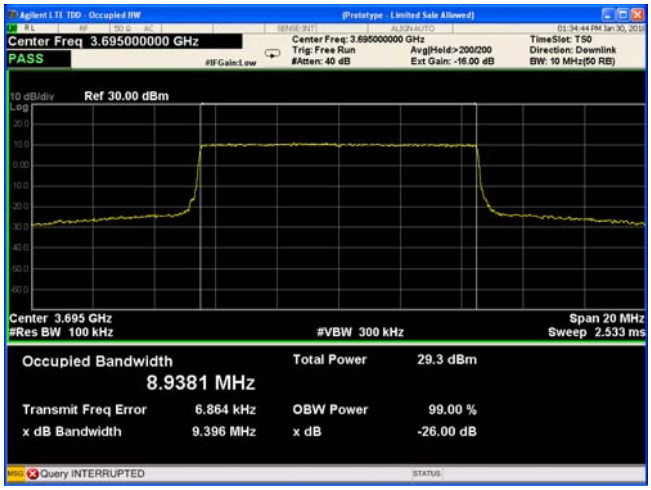
10MHz - Low CH 64QAM



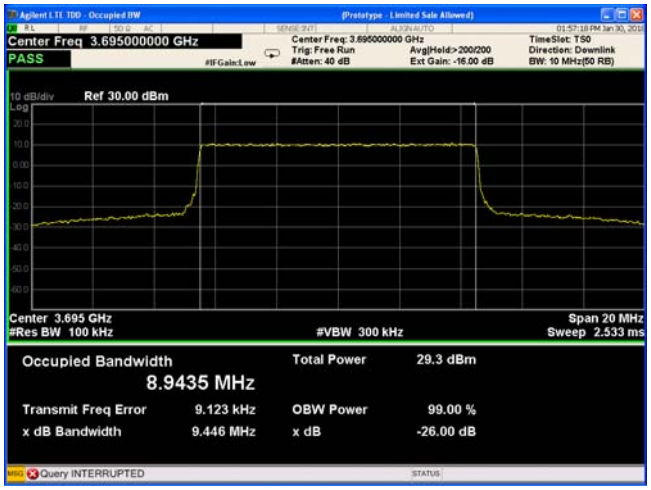
10MHz - Middle CH QPSK



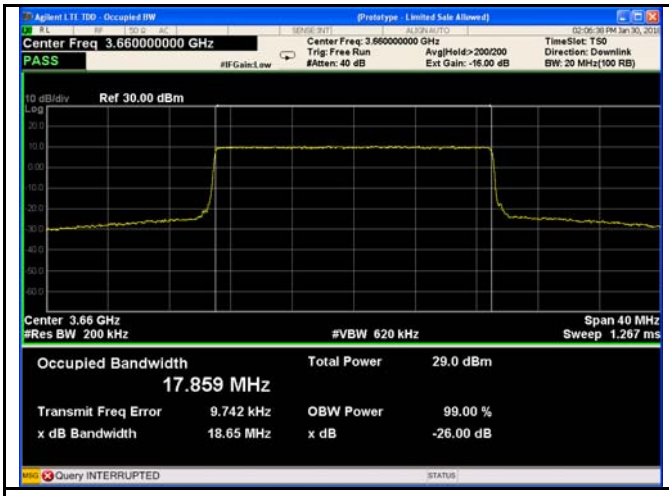
10MHz - Middle CH 64QAM



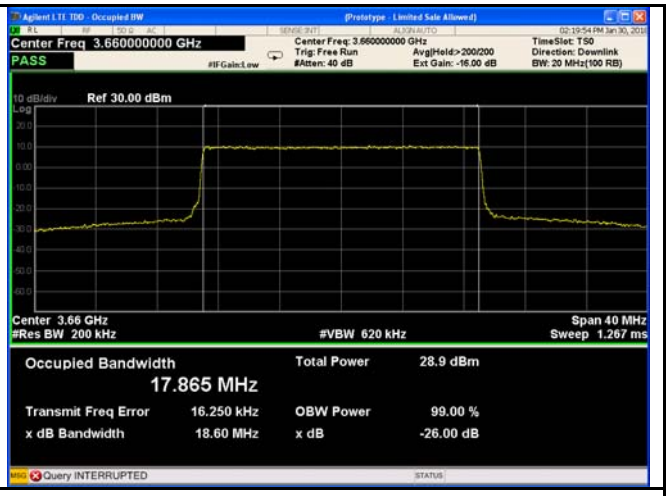
10MHz - High CH QPSK



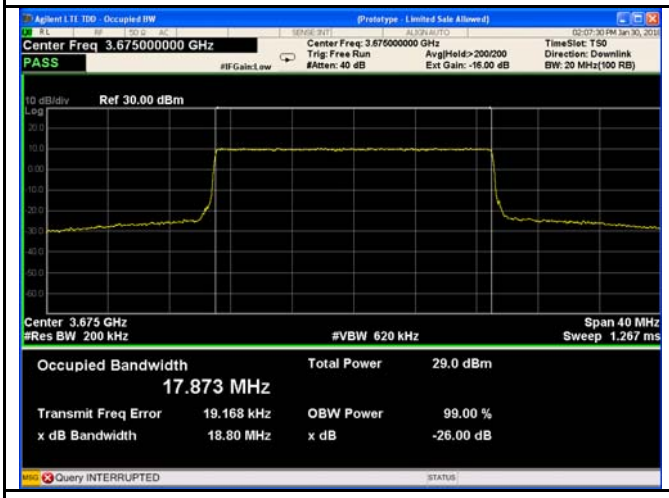
10MHz - High CH 64QAM



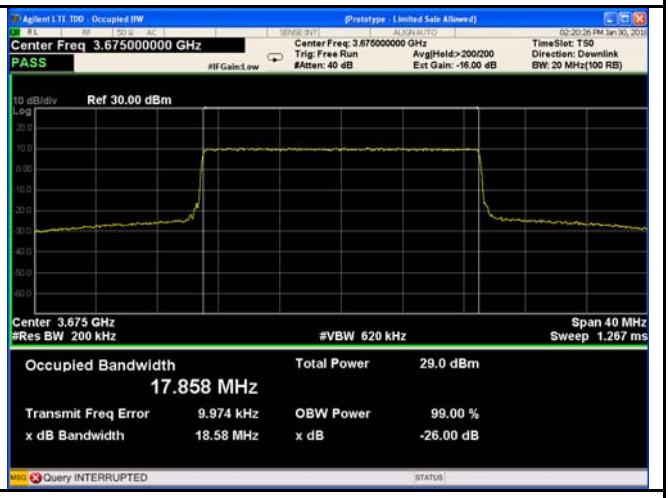
20MHz - Low CH QPSK



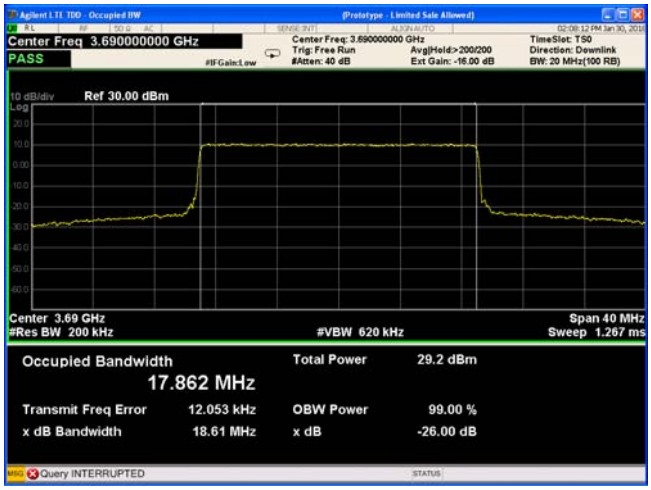
20MHz - Low CH 64QAM



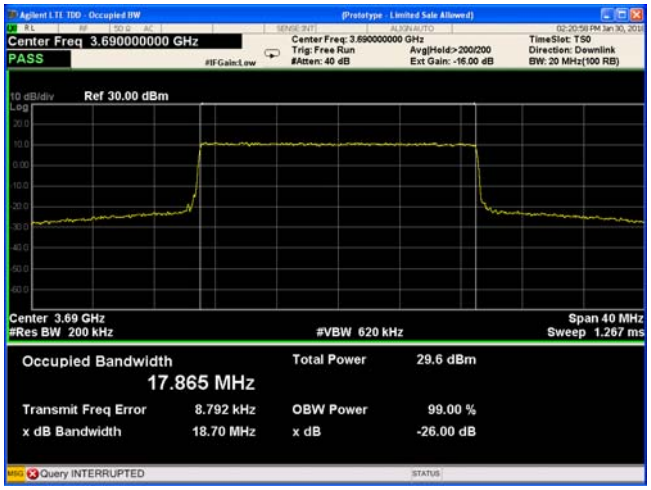
20MHz - Middle CH QPSK



20MHz - Middle CH 64QAM

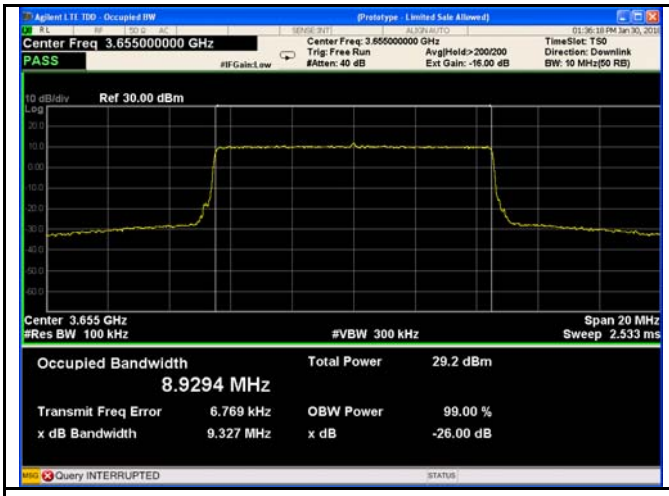


20MHz - High CH QPSK

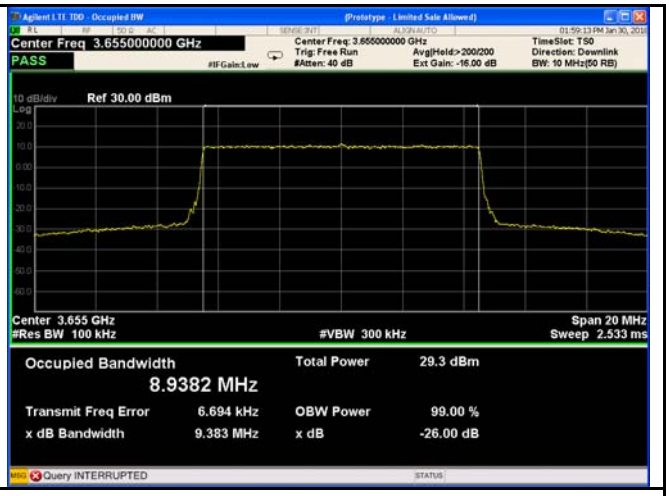


20MHz - High CH 64QAM

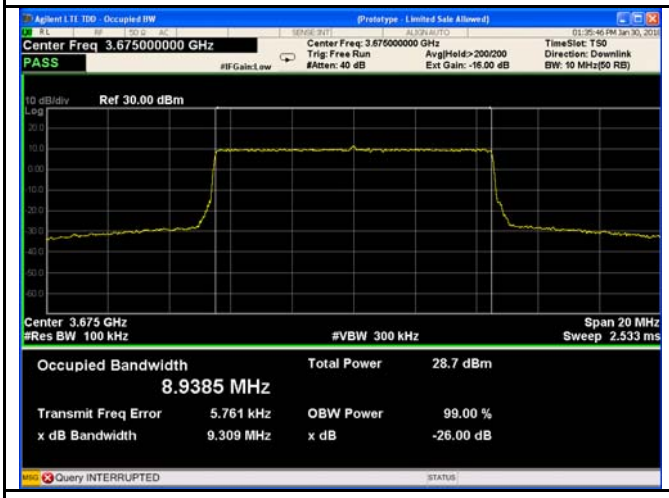
Slave-Chain 1



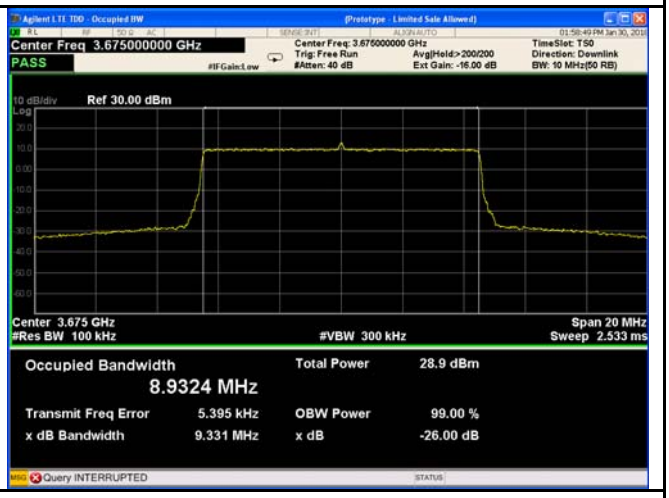
10MHz - Low CH QPSK



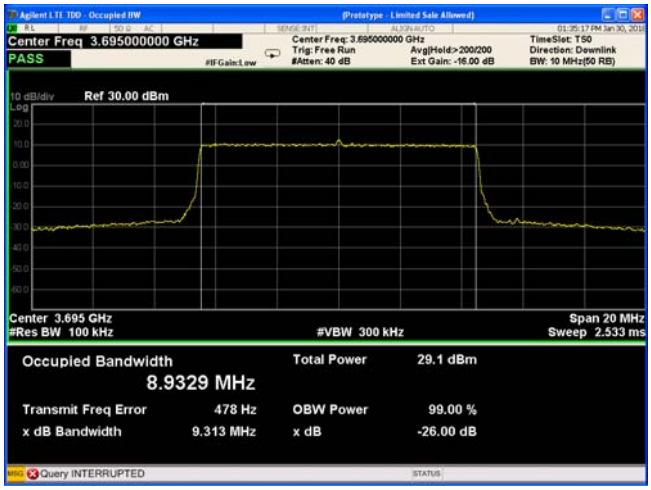
10MHz - Low CH 64QAM



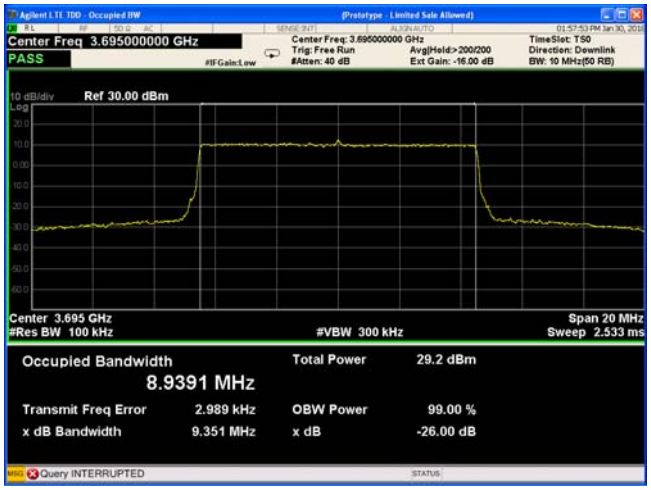
10MHz - Middle CH QPSK



10MHz - Middle CH 64QAM



10MHz - High CH QPSK



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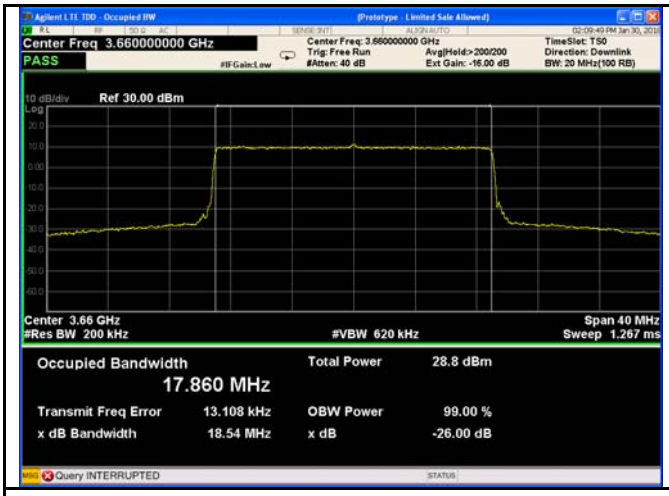
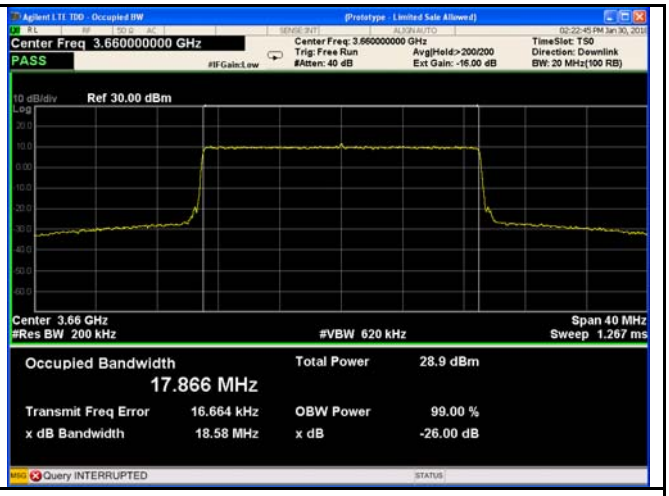
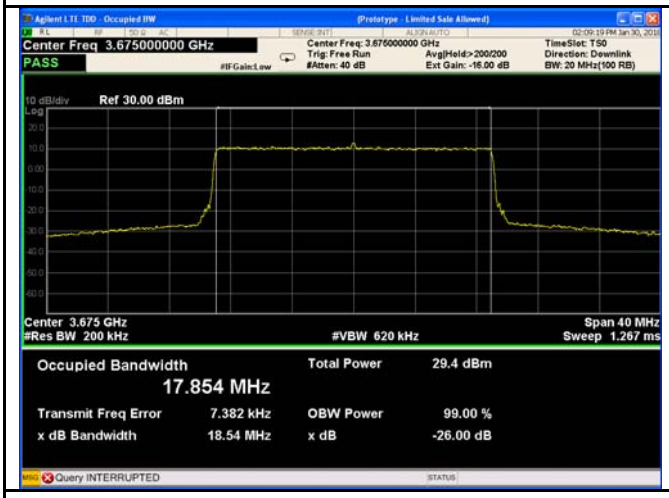


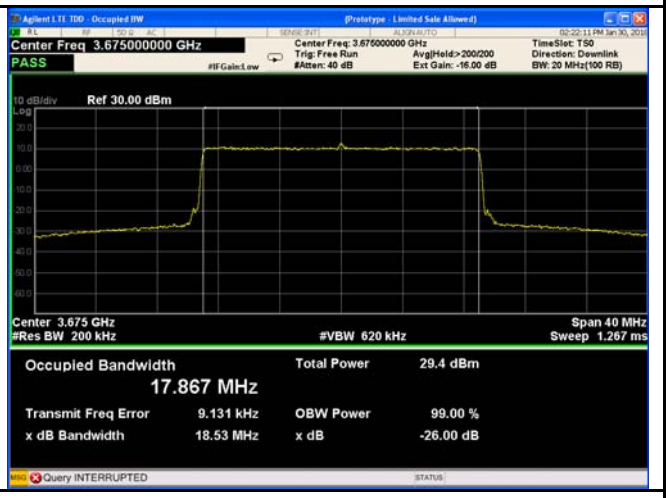
20MHz - Low CH QPSK



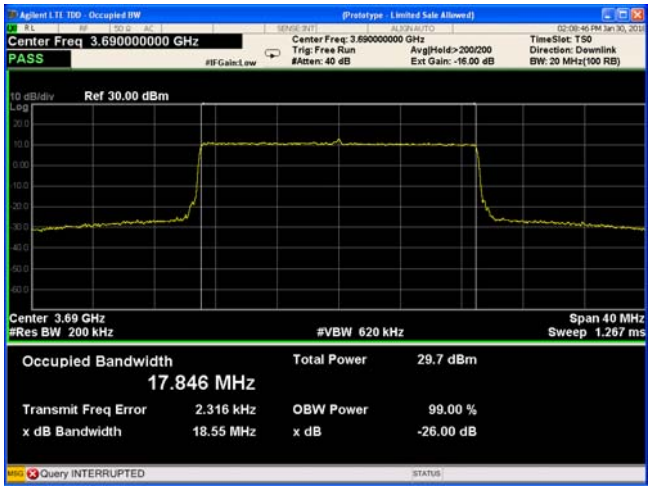
20MHz - Low CH 64QAM



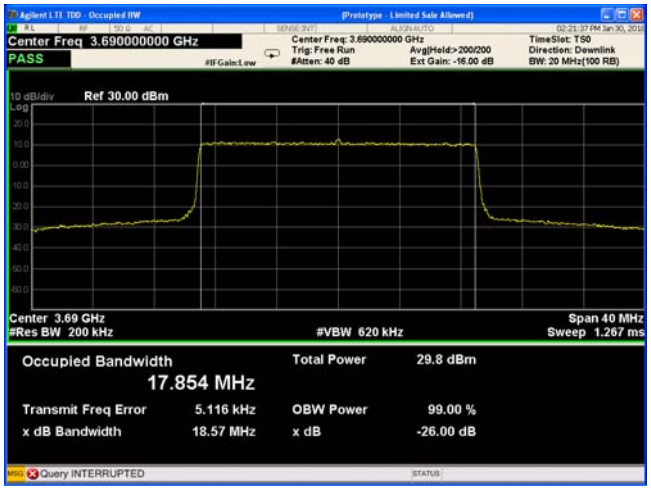
20MHz - Middle CH QPSK



20MHz - Middle CH 64QAM



20MHz - High CH QPSK



20MHz - High CH 64QAM

10 Emission Mask

Test Requirement:	FCC part 90.210(b)
Test Mode:	Data communicating mode
Limit:	Emission Mask B. For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows: (1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB. (2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB. (3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB

10.1 EUT Operation

Operating Environment :	
Temperature:	22.5 °C
Humidity:	52.3% RH
Atmospheric Pressure:	101.2kPa

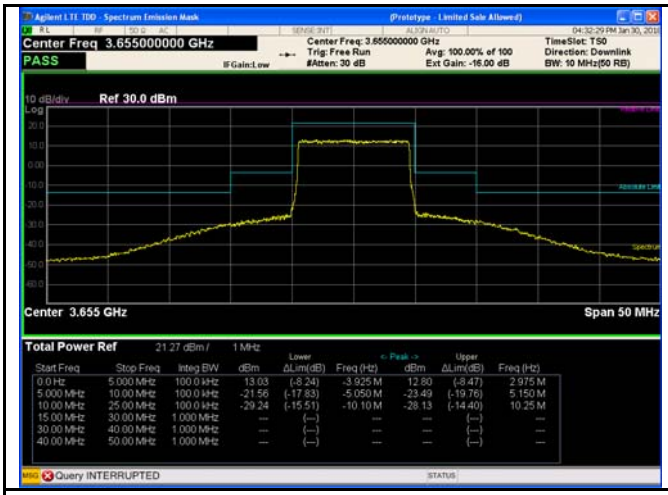
10.2 Test Procedure

1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
2. RBW=100kHz, VBW=1MHz, Detector mode= RMS,
Trace mode: Power averaging over 100 sweeps

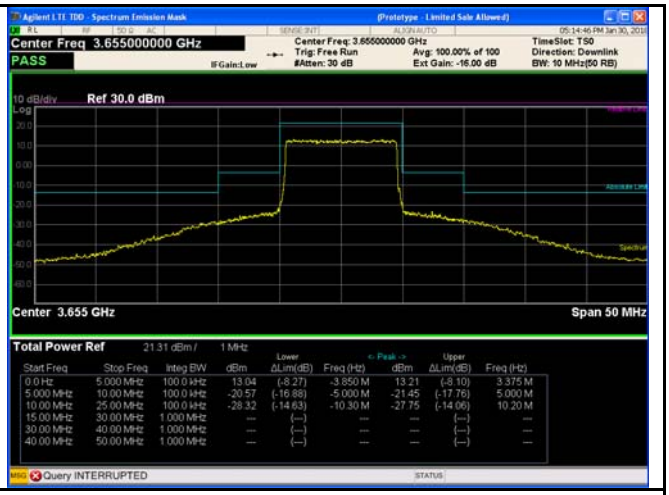
Note: For FCC part 90.210(b) 3, more than 250 percent emission was considered in radiated emission test items.

10.3 Test Result

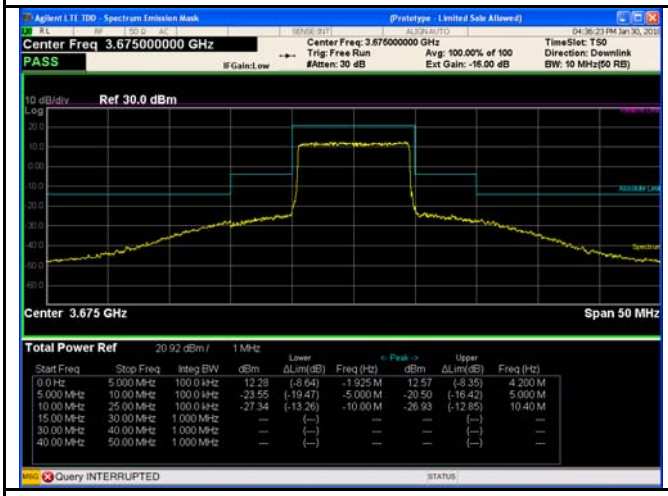
Test Plots
Master-Chain 2



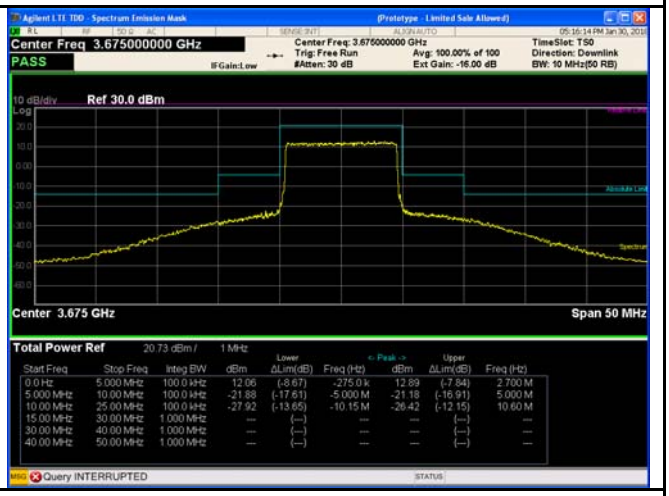
10MHz - Low CH QPSK



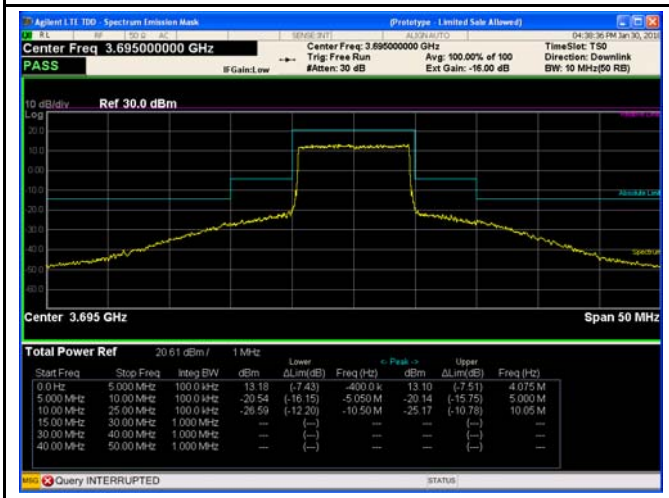
10MHz - Low CH 64QAM



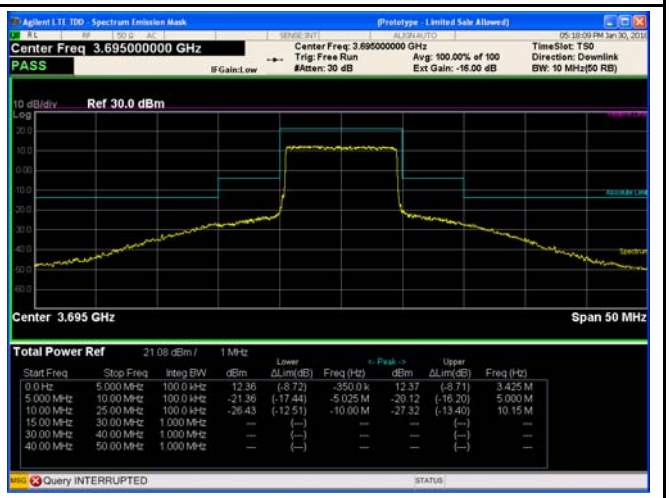
10MHz - Middle CH QPSK



10MHz - Middle CH 64QAM



10MHz - High CH QPSK



10MHz - High CH 64QAM